TECHNICAL MANUAL

TITAN 200
PAPER CUTTER

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TM. 200-A
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INTRODUCTION **The information contained in this document is intended solely for Challenge trained service technicians. There may be situations that are not covered by this manual. The information contained in this manual is to guide a technician to possible repair solutions. This manual is to be used in conjunction with the TITAN 200 instruction and parts manual P/N F-200 (A).**

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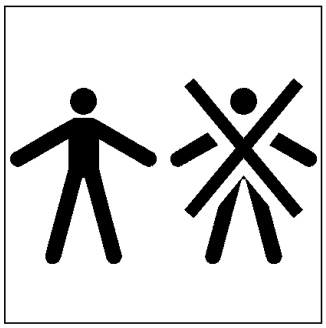
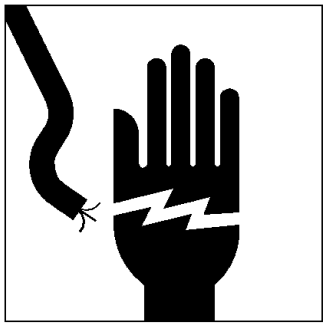


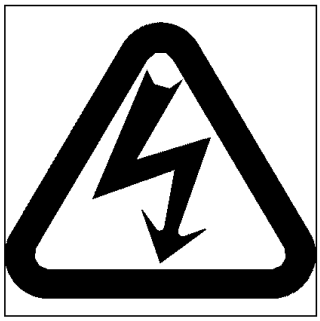
SINGLE OPERATOR

Do not operate with more than one person.



SHOCK HAZARD

Disconnect power before removing cover.
Replace cover before operation



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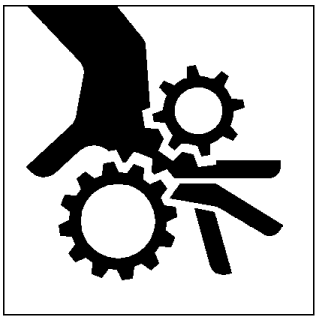


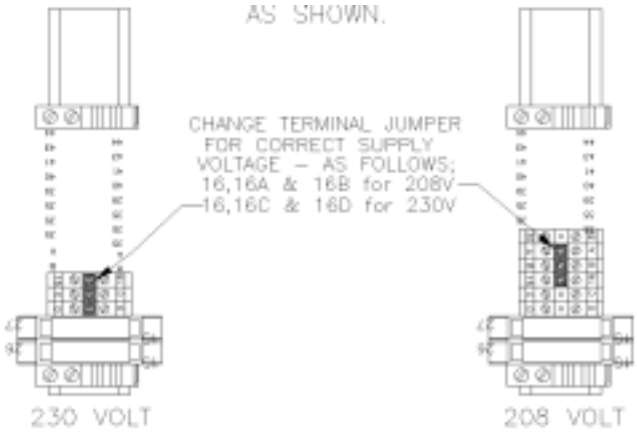
HAZARD AREA

Disconnect power before cleaning, servicing or making adjustments not requiring power. Do not alter safety guards or devices, they are for your protection. Replace all guards, do not operate with any guards removed.

GENERAL INFORMATION

ELECTRICAL SPECIFICATIONS

The cutter requires a 208/230vac 15-amp service. The cutter has a power cord, which requires a NEMA 6-15R or 6-20R receptacle. The proper way to test voltage is from before power up through a complete cycle. The voltage must be tested at the main fuse holders. The meter used must have a reaction time of at least 100ms or a low voltage record function. A low quality meter will not respond fast enough to give a true minimum voltage reading. Low voltage to the cutter will blow the main fuses. When the voltage drops, the 24vac (solenoids) and 5vdc (computer) will have problems. The low limit is 190 vac using the above test. The high limit is 245 vac.



The voltage for the power panel can be matched to the measured incoming voltage. Reposition the jumper located in the center of the terminal strip. **Do not remove any wires.**

All Titan 200 s/n 981388 and down are 230vac only. If the voltage drop are 210vac or below during a cut, a buck/boost transformer, p/n K-2834, is required. Note: The buck/boost can also be rewired to buck voltage 250vac down. Call Challenge for rewiring. Always check the serial number tag to determine the proper voltage range.

MACHINE DIMENSIONS

The Net weight is 755 LB (342kg). The height is 53”(135cm), length is 49” (124cm), and width is 36” (91cm). Removal of the table, front guard and treadle will allow the machine to go through a 31 1/4” (79.4cm) door way.

MACHINE REVISIONS

TITAN MAIN BOARD REVISIONS

The main circuit board, EE-2762, was changed to EE-2762-1. When using an EE-2762-1, the H-10 and H-11 must **not** be connected.

Titan 200 cutters above s/n 971103 use EE-2807, the LCD display is no longer back lit. On EE-2807, the H-10 jumper must be connected and H-11 jumper must **not** be connected. Both black plastic jumpers are located near the F3 fuse. The EE-2807 can **not** be used for replacement a EE-2762 and EE-2762-1.

The EE-2807-1 is a direct replacement for the EE-2807. The H-10 jumper must be connected and the H-11, 12, 13, 14 must **not** be connected.

CLAMP DAMPENER ASSEMBLY MOUNT REVISION

The upper mounting stud for the clamp-dampened cylinder has been changed to a three-piece mounting. The first production Titan with the change is s/n 981319, (July-98). The part numbers are H-6938-416 (1/4x20x1"set screw), E-1152-68 (1/4x20x1"hex spacer), H-6918-412 (1/4x20x1½" cap screw). If the stud is broken, it can be removed with an "screw extractor ". Install the set screw so ½" is extended out from the frame. Tighten the spacer onto the setscrew. Slide the cap screw into the top hole of the dampened then tighten screw and damper to the spacer. The fluid in the damper is 100# hydraulic fluid, which is used in the reservoir of the pump.

MANUAL MISPRINT

Titans s/n 971103 and up main board yellow IN7 input, for hydraulic latch will never light. The Sensor Data input “HYDLAT” will function. Titans s/n 971102 and down the hydraulic latch relay was located on a separate relay board.

SINGLE CUT BUTTON REVISION

The green light button was changed to a heavier duty non-lighting style. This heavy duty button was used beginning with serial number 981342. Early machines require conversion kit K-2874.

HYDRAULIC PUMP REVISION

The first machine with the revised motor/pump is s/n 971157 (Dec 97). Replacement pump/motor number is H-220-5. Replacement motor/pump units have a different mounting bolt pattern. It is acceptable to use only two mounting bolts. Parts are not interchangeable from earlier to later units. The manifold and valves are not affected.

MANIFOLD SEAL REVISION

Hydraulic manifolds stamped with an “-A” in the top corner use a 7/8 ” O- ring. The two O- rings are located between the manifold and the pump. The machines affected are s/n 981271 (Sept-98) to s/n 991570 (Mar-99).

BACKGAUGE FUSE REVISION

A kit is available to keep the “F1” fuse from blowing. The kit number is K-2908. A 5A (SB) fuse is being added. The first Titan 200 with the new fuse is s/n 991734, August 99. It is located on the revised circuit board (EE-2807-1) and is labeled “FL”.

FRONT GUARD INTERLOCK SWITCH REVISION

The interlock switch mounted on either side of the front opening was changed by the manufacturer. The first machines affected were built late April 2000. The replacement switch is part number E-2457-6, also six E-1214-65, ¼ “ quick disconnects are needed (per switch).

GENERAL HYDRAULIC INFORMATION

HYDRAULIC FLUID CHANGE

The oil should be changed every 1000 hours or once a year. Use 100 weight (ISO VG 100) hydraulic oil only. An electric hand drill pump can be used to remove the oil from reservoir through the filler hole. The hydraulic pump does have a strainer and magnet. It is recommended as part of the regular oil change that the reservoir be removed to wipe the interior of the tank clean. The O- ring seal may be reused if it is not damaged (p/n is S-1810-37).

PRESSURE GAGE

The gage supplied with the Titan is filled with clear glycerin. If the gauge liquid turns yellow, hydraulic fluid has leaked into the gauge and it must be replaced. If the rubber top seal leaks, replace the gauge (p/n 8P-629-3).

OPERATOR SETTING CLAMP PRESSURE

The clamping pressure range is 400 to 800 psi. Turning the clamp pressure reducer cartridge cw increases pressure and ccw decreases pressure. One turn of the adjustment screw equals approximately 75 psi. Don't adjust below 400 psi. the because clamp and knife will be out of sequence.

PRELIMINARY VALVE SETTING

The four adjustable cartridge valves in the hydraulic system can be preset manually to an approximate setting. These adjustments should be done only as a last resort. The valves are not interchangeable. Each valve is to be turned in all the way (cw) then turned out (ccw) a specific amount of turns. Main pressure cartridge 4 turns. Knife down sequence 3 turns. Clamp up sequence 1 turn. Clamp pressure reducer (adjustable by the operator) 4 turns (800 psi). Use the hydraulic pressure setting section in the manual for final adjustment.

VALVE INFORMATION

Listed is general information for testing and checking.

VALVE	CHALLENGE NUMBER	MANUFACTURES NUMBER	SPRING TENSION	INNER SPOOL MOVEMENT
MAIN SYSTEM	HH-304-1	RV1-10-S-0-18/	HEAVY	¼" (6MM)
DOWN VALVE	H-200-2	SV1-10-4-0-00	LIGHT	1/8" (3MM)
CL. UP SEQ.	H-203-6	RV3-10-S-0-36/	MEDIUM	¼" (6MM)
CLAMP PRESS	H-203-13	PRV1-10-S-0-12/	MEDIUM	¼" (6MM)
KN. DN. SEQ.*	H-203-7	PSV2-10-S-0-12/	MEDIUM	1/8" (3MM)
		PSV4-10-S-0-12/	MEDIUM	1/8" (3MM)
ELEC. CL.**	H-203-33	EPRV1-5824-14	LIGHT	3/16" (5MM)

* KN. DN. SEQ. Used two different valves

** Cartridge comes with coil E-1069-19

SOFTWARE REVISIONS

Titan 200 with front guard using EE-2762 circuit board and **EE-1766-41** software.

1.0 Original software.
1.1 Increased knife latch timing.
1.2 False Camp Plate limit was 1.750; changed it to 1.875.
1.3 This revision contains all of the languages. In fraction mode corrected positioning problem.
1.4 Increased timing between scr and brake turning on an off. This is performed at the beginning of each zero cross.
1.5 Enables the Preset interrupt during the zero-cross. Allowed maintenance mode access during preset screen. Changed send routine for better positioning accuracy.
1.6 Added noise protection to prevent erroneous backgauge control touch pad movement. This error causes the machine to show actual backgauge position instead of the "sent to" value.
1.7 Allow accuracy adjust to be set in mm. Fixed a backgauge creep problem that would occur if the foot pedal was pressed during a send. **Note**: This is the highest possible revision software the for EE-2762 circuit board.

New Board, **EE-2807** Starting at s/n 971102

1.9 Added a delay in the backgauge routine to prevent fuses from being blown in the back-gauge circuit when using the slide pot in the center or bottom edge.
2.0 A) Added Challenge logo to sleep screen.
B) Added electric clamp option in the “diagnostic” menu.
C) Immediately position to 5” after preset.
2.1 Changed reverse limit from 20.050 to 20.030 to prevent bumping in the back.
2.2 A) Electronic clamp pressures range adjustable in the DIAGNOSTIC menu.
B) REPOSITIONING is added as an option in the parameters menu. This allows the machine to reposition automatically from a sent position if the back gauge moves back .005” or more.
C) When entering data in a job, if a math function key is pressed, the operation assumes the previous data, not the backgauge position.
2.3 Forced PUSHOUT if the forward movement is < .005”.
2.4 Allow ELECTRIC CLAMP option to be on.
2.5 If the backgauge is moving at a high speed, the brake is applied near the front and back to prevent bumping.
2.6 A) Added auto memory initialization for new boards.
B) Added memory test to initialization routine.
C) Correct translation errors.
2.7 A) Improved positioning time by shortening the slow down distances and making the slow down distance self-adjusting between .2” and .75”.
B) Added input status to the end of several error messages.
Knife Latch Failure 1 = Latch disengaged when it should be engaged
Knife Latch Failure 0 = Latch engaged when it should be disengaged
Hyd Latch failure 1 = Latch Relay is off When it should be on.
Hyd Latch failure 0 = Latch Relay is on when it should be off.
2.8 A) Adjust for new 1/8 hp back gauge motor
B) Service message reads “Lubricate Machine”
C) Lubricate alarm frequency twice knife alarm count
D) Attempt to reduce F1 blowing computer responds quicker to the backgauge movement Commands
2.9 Improved electronic clamp pressure routine to reducing changing “CP” number.

Titan 200 with cut buttons (N.C.) using EE-2807 circuit board and **EE-1766-42** software

The revision descriptions for 2.0 and on is the same as EE-1766-41

Titan 200 with cut buttons (N.O.) using EE-2807 circuit board and **EE-1766-50** software

2.3 Original software.

2.5 If the backgauge is moving at a high speed, the brake is applied near the front and back to prevent bumping.

2.6 A) Added auto memory initialization for new boards.
B) Added memory test to initialization routine.
C) Correct translation errors.

2.7 A) Improved positioning time by shortening the slow down distances and making the slow down distance self-adjusting between .2" and .75".
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Hyd Latch failure 0 = Latch Relay is on when it should be off.

ERROR CODES DESCRIPTIONS

ERROR MESSAGES THAT DON'T REQUIRE A FLOW CHART

ERROR	EXPLANATION	PROCEDURE
Result is Negative	Math operation result was negative	Press Clear key
Data out of Range	Send position beyond forward or reverse limits	Press Clear key
Send Canceled	Back gauge in motion and a console key was pressed	Press Clear key then Send key to complete movement
Number Outside Limit	Send position beyond forward or reverse Limits	Press Clear key
Back gauge at Limit	Back gauge position at either end of table	Move back gauge in opposite direction
Memory Locked	Tried to change a locked channel	Press Clear key
Next Channel Locked	Linked channel locked	Press Clear key. Move locked channel to another. location
Sharpen Knife	Operator sets knife count for sharpening	Clear message: Enter Maintenance, Enter Parameters, Enter Knife count Enter clear count. Press exit 4 times Change knife count Enter Knife Count Enter Knife Alarm. Enter number of cycles Press exit 4 times
Lubricate Machine	The relubrication message has been activated	Clear message: Enter Maintenance Enter Parameters, Enter Knife count Enter clear lube. Press exit 4 times.
Checksum Error Memory Failed	Defective EPROM chip. Memory failured	Replace chip Replace main board .
Hyd latch error 0	Board mounted relay failed to turn off Sensor data, "hydlat" didn't change from 0 to 1 Occurs when pump motor turns off	Replace main board EE-2807-1

ERRORS (NO MESSAGE) THAT REQUIRE A FLOW CHART

ERROR	EXPLANATION	PROCEDURE
Clamp stuck down	Upward movement of spring return clamp Did not overcome mechanical bind.	See flow chart page 27
Slow backgauge movement to end of table	Main board is sensing the preset is always activated.	See flow chart page 28
Hydraulic motor didn't start	Motor didn't start at the beginning of a cut	See flow chart page 24
A continious beeping	Press CLEAR to stop alarm	See Positioning Error.

ERROR MESSAGES THAT REQUIRE A FLOW CHART

ERROR	EXPLANATION	TEST PROCEDURE
Hyd up failure	Clamp failed to return up after 4 sec.	See flow chart page 29
Knife down failure	Knife failed to go down after 4 sec.	See flow chart page 30
Knife up failure	See Sequence Error or Knife at both limits	
Sequence error	Knife came down before clamp or Clamp came up before knife. Clamp up prox made while knife up prox unmade.	See flow chart page 31
Knife at both limits	Knife up or knife down proximity sensor not switching or switching at the wrong time	See flow chart page 32
Positioning error	Back gauge missed programmed position by .005". Back gauge accuracy off by .010" when wand goes through preset sensor,	See flow chart page 25
Clamp/Knife down	When in a program or send mode (Not manual backgauge mode) knife or clamp not up	See flow chart page 26
Clamp down failure	Clamp did not come down at the start of a cycle	See flow chart page 33
Backgauge failure	Backgauge did not move after presetting	See flow chart page 34
Shorted key error	Any key (except backgauge slide)held on for longer than 90 seconds	See flow chart page 35
Encoder wires 9 and 10 are reversed or Backgage direction Reversed	Encoder wire pulse wire are backwards or backgage power wires are backwards. Typically this happens only on a table out installation.	See flow chart page 36

Knife latch failure 1	Prox sensor on when should be off. The pin should be in the disengaged position i.e. pulled out from under knife bar.	See flow chart page 37
Knife latch failure 0	Prox sensor off when should be on. The pin should be in the engaged position i.e. pushed under knife bar.	See flow chart page 38
Hyd latch error 1	Board mounted relay failed to turn on Motor will not start Sensor data, "hydlat" didn't change from 1 to 0	See flow chart page 39

SENSOR DATA ABBREVIATIONS AND MEANINGS

The knife and clamp are at top of stroke with the hydraulic motor off and line light on.

INPUTS/OUTPUTS	**IDLE**	**DESCRIPTION**	**LOCATION**
RHSAFE (in)	0	R. H. safety switch or cut button	Inside right font cover
LHSAFE (in)	0	L.H. safety switch or cut button	Inside left front cover
KNFLAT (in)	1	Knife latch proximity sensor	Left side of cutter opening
KYDLAT (out)	1	hydraulic latch relay	Main board
KNFDWN (in)	1	Knife down proximity sensor	Lower right corner of knife bar
PRESET (in)	1	Preset sensor	Under left side of table
CUTSOL (out)	0	Cut Down valve	Solenoid on left side of hyd. manifold
UNLOAD (out)	0	Not used	
KNLATSOL (out)	0	Knife latch solenoid	Left side of cutter opening
CLAMPUP (in)	1	Clamp up proximity	Top right corner of clamp (rear view)
HYDUP (in)	1	Clamp cylinder up proximity	Bottom of clamp cylinder
KNFUP (in)	1	Knife up proximity	Top left corner of knife bar
CUTBTN (in)	0	Single cut button	Green button on console
N.C.	0	not used	
HYDMOT (out)	0	hydraulic motor relay	Right of main board
N.C.	0	Not used	
LTLINE (out)	1	Line/table light	Two light bulbs above knife bar
CBTNLIT (out)	0	Not used	

TITAN 200 TEST & ADJUSTMENT PROCEDURES

TESTING DOWN VALVE COIL MAGNETISM

1. Remove the ¾" nut holding the coil to the valve.
2. Slide the coil away from the base of the valve ¼".
3. The coil should move easily on the valve stem.
4. Make a cut.
5. If there is voltage and the coil is good, magnetism will move it back the ¼" to the base of the valve. If a screw driver blade is placed inside the center of the coil then cycle the cutter. If magnetism is felt the coil, cable and main board is good tested.

TESTING ANY HYDRAULIC VALVE SPOOL OPERATION

1. Remove the valve from the manifold. There isn't trapped hydraulic pressure, some fluid will flow out. Always use a 1" box end wrench or deep well socket only on the hex on the valve. Never use an adjustable wrench or pliers to remove or install a valve.
2. Use a small rod to push in on the end of the valve that was in the manifold. The spool inside the valve must move smoothly in both directions. Each valve type has a different spring tension and some do not have springs at all. On adjustable valves, the spring tension can be lessened to help in testing spool movement. Loosen the jam nut then turn the allen screw CCW to reduce spring pressure. See General Hydraulic Information, ie Valve information for spring tension.
3. Check for damaged black "O" rings or white split Teflon spacers.
4. Check the manifold cavity for loose particles
5. Reinstall valve. It does not require excessive force to retighten the valve. Do not tighten over 40 FT LB of torque.
6. Typically, a valve that cannot adjust its pressure range is defective.

SEQUENCE OF ADJUSTING HYDRAULIC PRESSURES

Turn adjuster clockwise to increase pressure, counter clock wise to reduce pressure. Reference F. 200 parts manual hydraulic schematic page for cartridge location.

1. Turn the clamp reducer valve (item 4), located on front face of blue manifold block, CW all the way.
2. Read main system pressure when clamp and knife are at the bottom of stroke. Adjust valve (item 11) on front of black pump to 1400psi.
3. Read knife down sequence pressure when clamp is at the table and the knife is moving down. Adjust front valve (item3) located on right face of manifold block to 900psi.
4. Read clamp up sequence when the knife is at top of stroke and the clamp is moving up. Adjust rear valve (item 1) located on right face of manifold block to 600psi.
5. Adjust clamp reducer valve, item 4, to a range of 400 to 800psi when clamp and knife are at the bottom of stroke.

TESTING AND ADJUSTING PROX SENSOR

1. Access the "SENSOR DATA " menu in the console. The zero and ones to the right of the abbreviations will indicate changed status as the prox is activated.
2. Place a thin metal strip in front of sensor. The target area has four red squares in a block pattern. When the strip is placed in front of the sensor the red LED should turn on and the sensor data indicator should change.
3. The distance from the rectangular prox sensor to a moving part is typically .01" to .06". The distance from the round prox sensor to a moving part is typically .01" to .125".

MANUALLY ACTIVATING THE HYDRAULIC MOTOR

Pressing the manual pin on the motor relay will activate the motor. This will raise the clamp and knife to the full up position. The relay is located on the right side center of the electrical panel. Do not push the relay for longer than 3 seconds, the main fuses may blow!

1. S/N 971102 and down the relay is 1.5" x 3" and brown/black with a small button on the long side.
2. S./N 971103 and up the relay is 3" x 3" and black in color. Press the top white plastic piece down.

TESTING AND REPAIR OF BACKGAUGE BRAKE RESISTOR

1. Resistor is white, 2" long by 3/8" square (may be two side by side), located on the right end of main board EE-2807-1. The resistor is next to the BRK, SCR, and DIR red LED's
2. Measure resistance from one lead to the other. A reading of 5 ohms means the resistor is good. A reading of infinity means the resistor is open and must be replaced.
3. A pair of 10 ohm, 10watt resistors can be purchased from Radio Shack, # 271-132.
4. Cut the defective resistor leads at the end of the resistor. This will leave a lead from the board to solder too.
5. Apply silicon sealant to the bottom of the new resistor
6. Lay the new resistors side by side (with silicone sealant in between) then wrap one lead around the other lead and solder.
7. Place new resistor on the board then cut the leads to overlap the leads on the board by 3/8".
8. Solder resistor leads to board leads.

TESTING ENCODER

Measure voltages on the screw heads of the EE-2807-1 header. If the voltages are correct, the EE-2807 is defective. The test gives a general condition of the encoder as it impossible to count all encoder pulses. If the voltages are not correct, see "TESTING CABLE". If cable is good, the encoder is defective. Turn motor pulley very, very slowly when testing A and B pulse.

Cable connector	Header	Function	Voltage
18 (black)	H2-4	common	common
20 (red)	H2-3	"+" voltage	5 vdc, power
17 (white)	H2-1	"A" pulses	toggles 5 & 0 vdc
19 (green)	H2-2	"B" pulses	toggles 5 & 0 vdc

TESTING ENCODER/BACKGAGE ACCURACY

This test is preformed when the accuracy alarm is activated or there is a question of backgage point to point accuracy.

1. Remove the backgauge pulley cover.
2. Turn off the REPOSITIONING option in the parameter menu.
3. Move the backgage to rear of the table. Manually turn the leadscrew pulley back til the backgage stops. Write down the dimension shown on the display.
4. Move the backgage only with the manual slide control to at least 6 different positions, never coming forward of 7 " (178mm).
5. Repeat step 3. The two numbers should match within (+ or -) .002.
6. If the numbers match the accuray problem is in the loading of the paper, backgage squaring or accuracy adjutment. If the numbers do not match the encoder, encoder cable or main board may be defective.

TESTING ENCODER CABLE

1. Unplug the cable connector at encoder. Measure voltages at the cable connector.
2. If voltages are correct, cable (E-2534-1) and main board (EE-2807) are good.
   If voltages are not correct, go to step 3.
3. With the cable connector still unpluggged at encoder, measure the voltage at the header screws.
   If voltage is correct the main board is good and the cable is defective.

Cable connector	Header	Function	Voltage
18 (black)	H2-4	common	common
20 (red)	H2-3	"+" voltage	5 vdc
17 (white)	H2-1	"A" pulses	5 vdc
19 (green)	H2-2	"B" pulses	5 vdc

REPLACEMENT EE-2807 & EE-2807-1 CIRCUIT BOARDS

1. Transfer all fuses from the original board to the new board. The FL fuse (EE-2807-1 only) will not have to be transferred. Fuse clips may have to be tightened (squeezed togethre) before reinstalling a fuse.
2. Transfer the EPROM from original board to the new board. Tip: Before removing old EPROM note position of locating notch on the chip.
3. The H-10 link must be connected, otherwise "Hydraulic Latch Error" will be displayed. The H-11 link must not be connected, otherwise the display and keyboard will not work.
   On EE-2807-1 links H-12, H-13, H-14 should not be made.
4. Test and adjust the back gauge accuracy.

TESTING INPUTS ON MAIN CIRCUIT BOARD

Inputs on the main board, EE-2807-1, can be manually activated. If the LED does not light nor the sensor data input change, the main board EE-2807 is defective. The sensor data menus are based on the the power on, knife/clamp in the up position and the hydraulic motor off.

1. Remove wire for the input to be tested from green header.
2. Touch one end of 12" insulated jumper wire to any 64 wire terminal.
3. Touch the other end of the jumper wire to the screw head where the input wire was attached.
4. If yellow LED lights, then the sensor or wiring is defective. If the yellow LED or the sensor data input doesn't change the main board, EE-2807, is defective.

TESTING MAIN BOARD OUTPUT and OUTPUT DEVICES

Outputs can be manually activated, except for the backgauge motor. The red output LED's only indicates computer commands, not actual operation of the output device.

Connect an insulated jumper wire from the 24vac supply (wire #33) then touch the other end of the wire to the to the screw head where output device wire is attached. The desired output device should turn on i.e., solenoid, relay or light. (Note: An error may be displayed). If the device turns on manually, the main board, EE-2807 is defective. If the device does not turn on, the device, wiring or F2, F3 is defective.

Output voltage can be measured. Check the voltage between at the main board output wire (?) and wire #35 when the machine is activated. NOTE: An unloaded output will measure a static voltage. The voltage will disappear or change when a load is applied.

TESTING AND LEVELING THE CLAMP

1. Remove the cut stick, false plate clamp if installed. Clean the bottom of the clamp.
2. Place a 2 1" x 22" strips of paper lengthwise from under the clamp (right and left), to the front edge of the table.
3. Close guard, if equipped, and make a cut.
4. When the clamp is at the table and the knife is swinging down, pull on the paper strips.
5. If the clamp is parallel, both strips will be held. If one of the strips is loose the clamp will have to be adjusted.
6. The adjustment is made by turning the nuts on the top and bottom of the pull clamp pull down rods. Adjust the side that does not hold the strip. Make only 1/8-turn adjustments. Loosen the upper nut. Tighten the lower nut to lower the high side.
7. Repeat steps 1 through 7 until both strips are held.

INSTALLATION AND ADJUSTMENTS FOR OF THE KNIFE LATCH ASSEMBLY:

1. The retracted position of the knife latch pin is adjusted before installation. The end of the pin should be flush with the face of the block that it slides through (the plastic screw head does not matter). Check the position of the pin by pushing in the solenoid plunger (not the lever) to bottom of its travel.
   a). Loosen the mounting screws of the solenoid.
   b). Push in the solenoid plunger to bottom of its travel.
   c). On the 41120-1 version slide the solenoid with plunger pushed in so the knife latch pin end is flush with the block. On the 41120-3 version slide the solenoid with plunger pushed in so the plastic screw on end of the latch pin is flush with the block.
   d). Retighten the solenoid mounting screws.
2. The latch assembly mounting plate should be visually parallel to the knife bar.
3. The top of the knife latch pin should be 1/64" (0.3mm) to 1/32" (0.5mm) below the knife bar. This clearance is set only when the knife is in the full up position (see manually section "Activating the hydraulic motor"). The latch plate mounting screws will have to be loosened slightly. The height adjusting screw is located at the bottom of the plate. Turn the screw CW to raise and CCW to lower the plate then tighten the jam nut. Tighten the mounting plate screws.

   INSTALLATION TIP: The top cover of the cutter should be tilted forward and the left front table side guide should be removed for easier access. Table side guide mounting screws can be removed through the two side left access hole covers using the knife bolt wrench.
4. The proximity sensor should be 1/64" (0.5mm) to 1/32" (1.5mm) from the solenoid lever arm. The sensor has a red four-point target for activation.

TEST BACKGUAGE ARMATURE (Procedure measuring backgauge motor for opens and shorts)

1. Turn power off.
2. Unplug the H1connector on the main board and remove motor cover. Measure the resistance between wire 45 and 46. Rotate motor pulley in small increments (one complete turn) while reading the resistance at each incremental stop. The nominal resistance should be 12 ohms. Values above 12 indicate open and values below indicate a short in the armature.
3. Unplug the H1connector on the main board. Measure the resistance between wire 45 and 46 to the unpainted part of the motor case. A reading of infinity (open) is correct. A reading less than infinity indicates a short.

FRONT GUARD INTERLOCK SWITCH ADJUSTMENT

1. Remove the interlock switch bracket assembly from the top cover.
2. Bend the strap, near the mounting screws, so it is parallel to the face of the interlock switch and has .015" clearance to the tip of the plunger.
3. Reinstall the bracket on the top cover. Open the front guard then adjust the interlock switch bracket assembly so the strap is flat against the cover but not depressing the plunger.

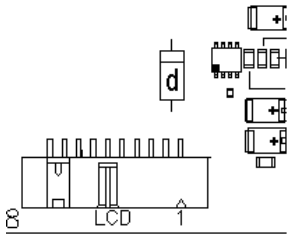
DISASSEMBLY OF SOLENOID COIL CABLE CONNECTOR

1. Remove screw completely from the center of square connector then remove connector from coil.
2. Unscrew cable strain relief nut.
3. Turn connector upside down. Place a small screwdriver in the narrow slot in one of the corners of the red center piece then pry it out. The cable will need to be pushed in.
4. Voltage can then be measured between the wires.

TESTING THE DISPLAY CONTRAST

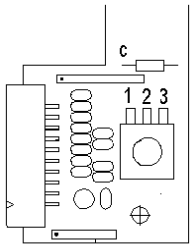
The LCD display uses 19 Volts DC for the contrast adjustment. The voltage is produced on the main circuit board, EE-2807. The contrast voltage on the main board can be measured from header H2 pin 7, to the non-line end (anode) of the diode located next to the H8 header. Use the left drawing below for (d) diode location.

EE-2807-1



H8 Header

EE-2764



The level of contrast is adjusted by a potentiometer located on the back of the console. The voltage is measured on the keyboard interface board located under the console cover. Use the above right drawing for reference. Use the left end of the resistor (shown with a "C") as the common. The voltage at leg 3 on the potentiometer should read -19vdc. The voltage at "2" on the potentiometer will have a range of 9vdc to 19vdc. Nominal operational voltage is approximately 12vdc.

Conclusions: No voltage between diode and H7-2, defective EE-2807.
No voltage between "C" and # 3, defective ribbon cable EE-2855-2.
No voltage between "C" and # 2, defective EE-2764.
All voltages good, defective LCD display, defective EE-2758-1.

TESTING AND MANUALLY ACTIVATING KEYBOARD

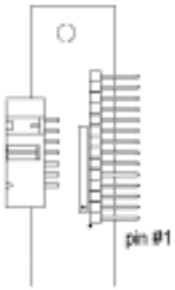
1. Remove the metal cover behind the console.
2. Disconnect blue tipped ribbon cable from interface board.
3. Turn power on.
4. Use a jumper wire shorting the exposed pins to manually activate a key function. Use the diagram and key list below.
5. If the console shows activity by manually jumping the pins, the keyboard is defective, 43002.

KEY	PIN	KEY	PIN
Clear	5 to 11	Send	5 to 13
# 1	9 to 13	# 2	8 to 13
# 3	7 to 13	# 4	9 to 12
# 5	8 to 12		
# 6	7 to 12		
# 7	9 to 11	# 8	8 to 11
# 9	7 to 11	# 0	8 to 10

Backgauge Slide Key

Pin 1 to 3	1K ohms fixed
Pin 1 to 2	1 K ohms variable*
Pin 2 to 3	1 K ohms variable*
	*when pressing guide

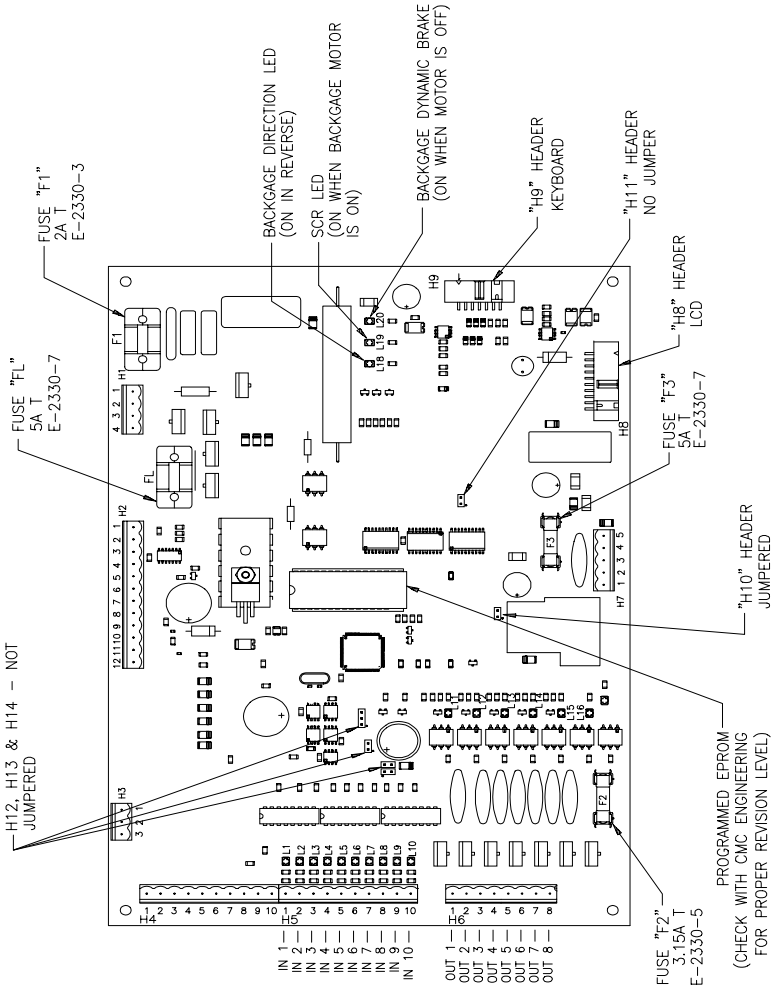
Interface board



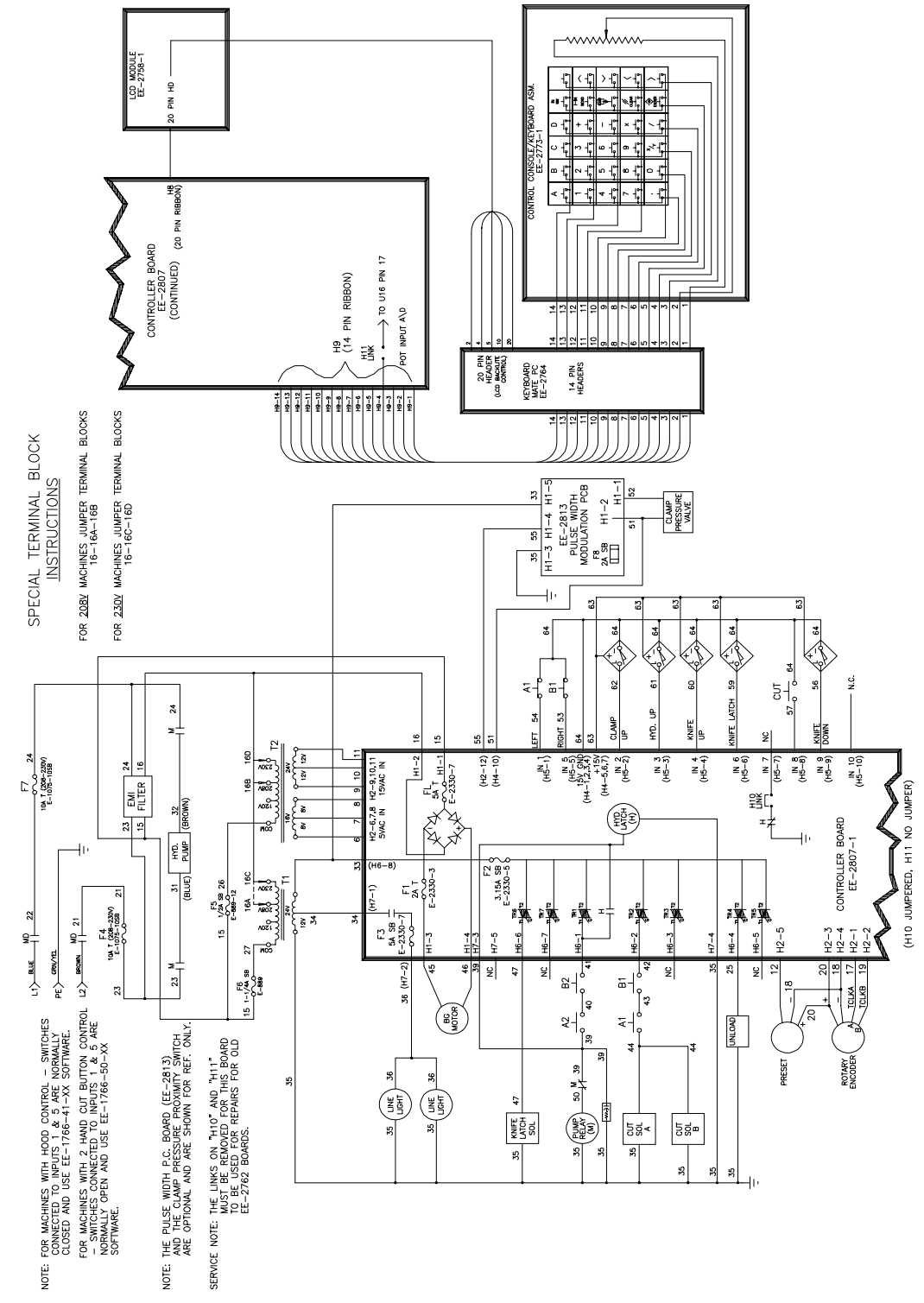
EE-2807 MAIN BOARD

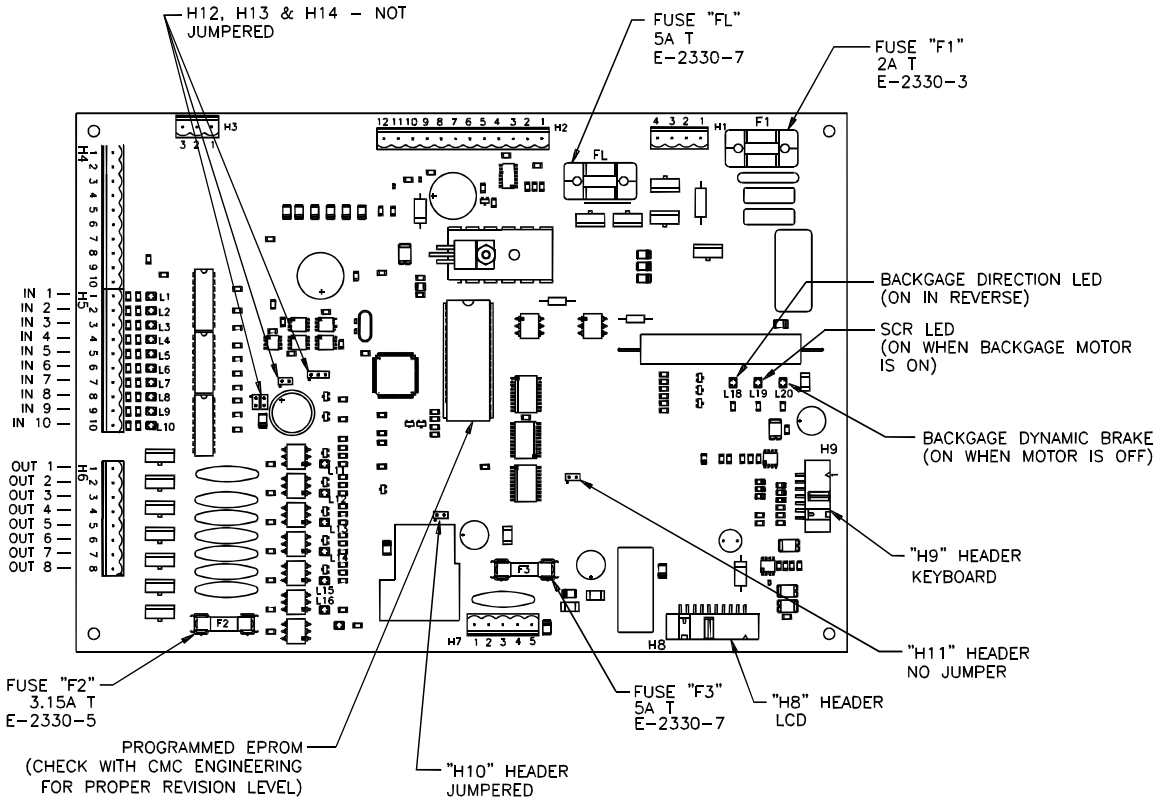
DESCRIPTION	IDLE STATUS
IN1: Left Interlock Switch	off when cover is closed
IN2: Clamp Up Limit	on when clamp is up
IN3: Hyd. Cylinder Up Limit	on when hyd. are up
IN4: Knife Up Limit	on when knife is up
IN5: Right Interlock Switch	off when cover is closed
IN6: Knife Latch Switch	off when k.l. is pulled in
IN7: Not Used	
IN8: Cut Switch	on when switch is pushed
IN9: Knife Down Limit	off when knife is down
IN10: Not Used	

DESCRIPTION	IDLE STATUS
OUT1: Hydraulic Motor	on when motor is running
OUT2: Cut Solenoids	off except for downward motion
OUT3: Not Used	
OUT4: Unload Solenoid	off when clamp is up
OUT5: Line Light	on when line lights are on
OUT6: Knife Latch Solenoid	off when knife is up
OUT7: Cut Sw. Light	on when ready for cut



BASIC MACHINE SCHEMATIC



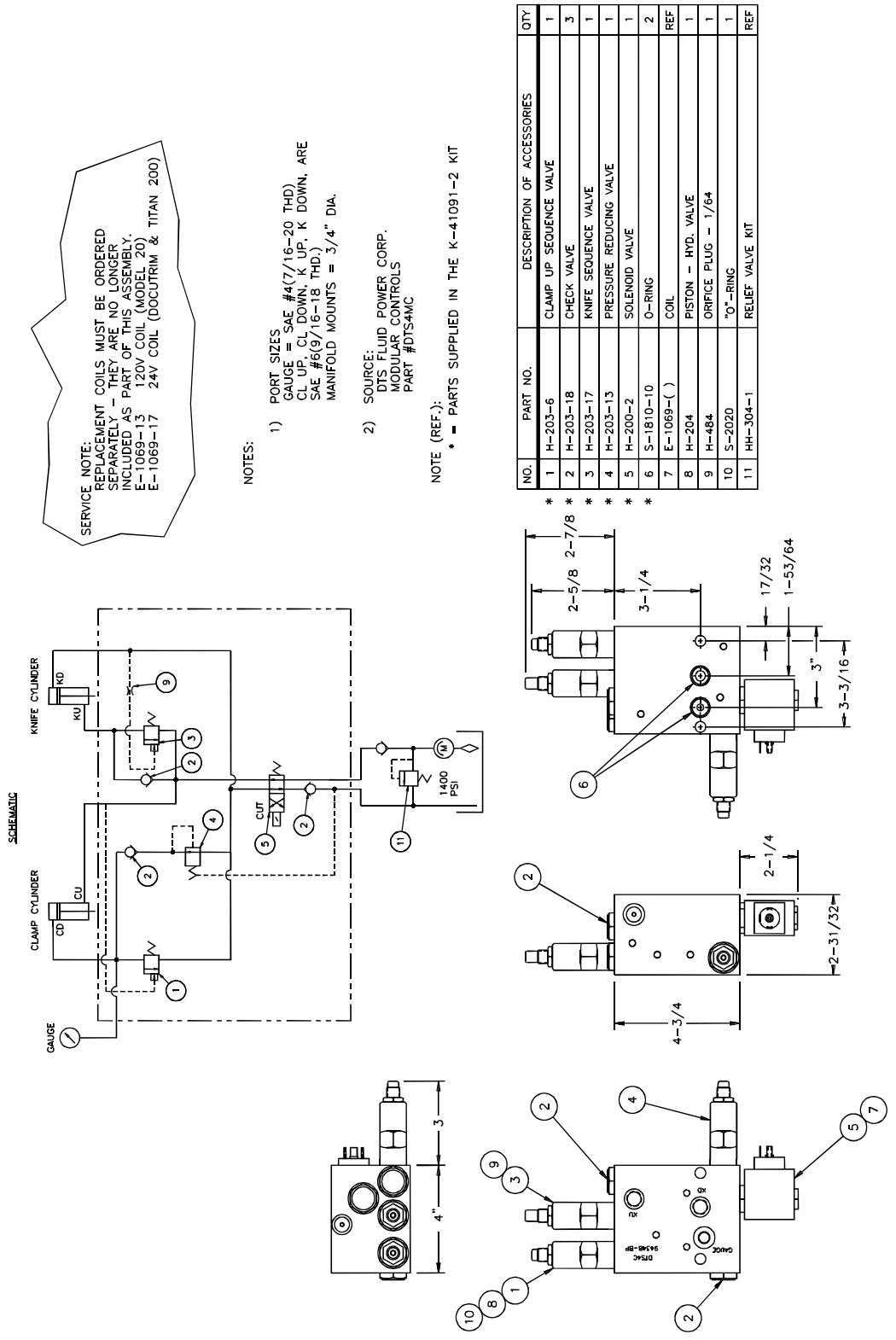


EE-2807-1

TITAN 200

	DESCRIPTION	IDLE STATUS
IN1:	Left Interlock Switch	off when cover is closed
IN2:	Clamp Up Limit	on when clamp is up
IN3:	Hyd. Cylinder Up Limit	on when hyd. are up
IN4:	Knife Up Limit	on when knife is up
IN5:	Right Interlock Switch	off when cover is closed
IN6:	Knife Latch Switch	off when k.l. is pulled in
IN7:	Not Used	
IN8:	Cut Switch	on when switch is pushed
IN9:	Knife Down Limit	off when knife is down
IN10:	Not Used	

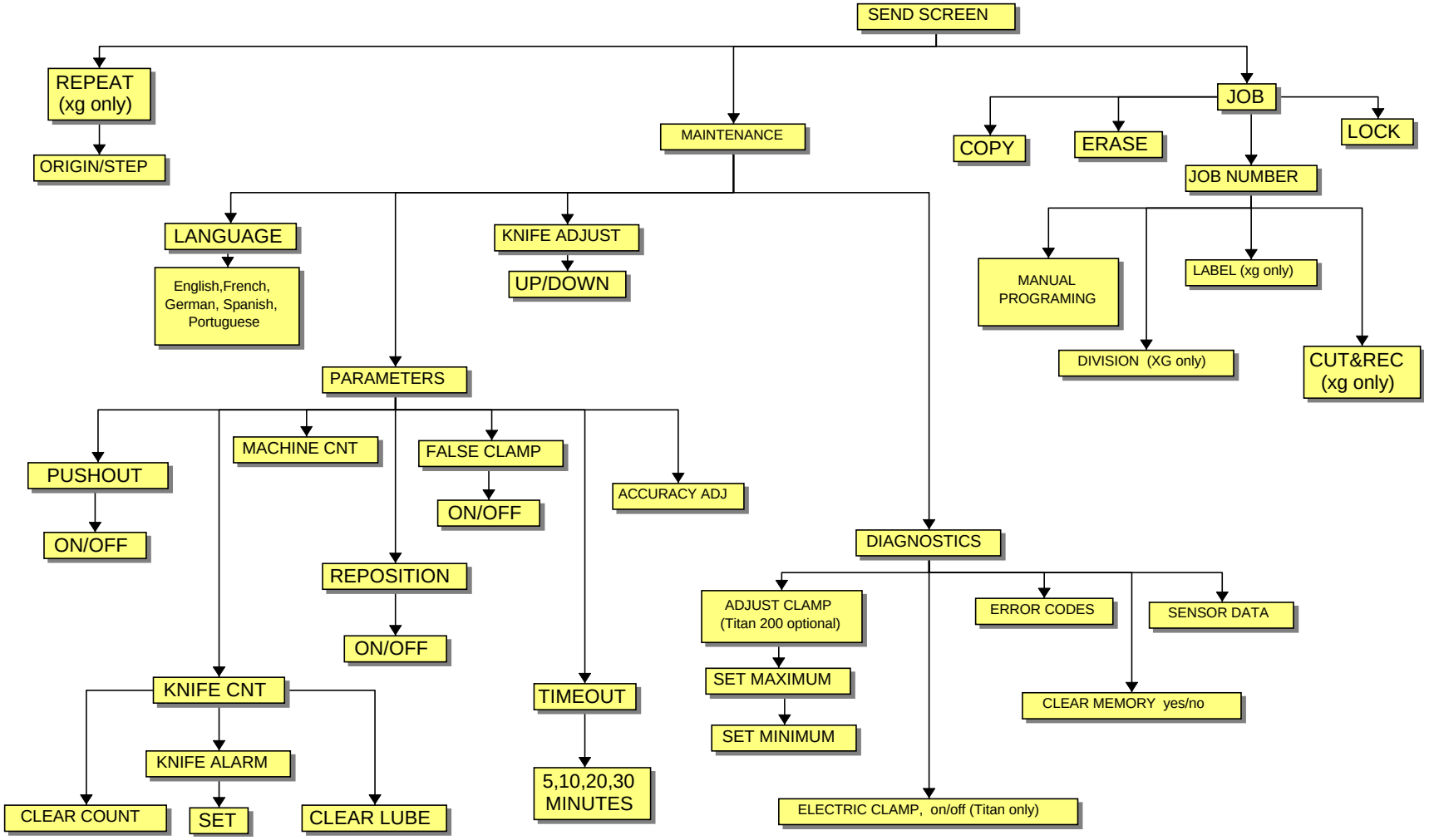
	DESCRIPTION	IDLE STATUS
OUT1:	Hydraulic Motor	on when motor is running
OUT2:	Cut Solenoids	off except for downward motion
OUT3:	Not Used	
OUT4:	Unload Solenoid	off when clamp is up
OUT5:	Line Light	on when line lights are on
OUT6:	Knife Latch Solenoid	off when knife is up
OUT7:	Cut Sw. Light	on when ready for cut



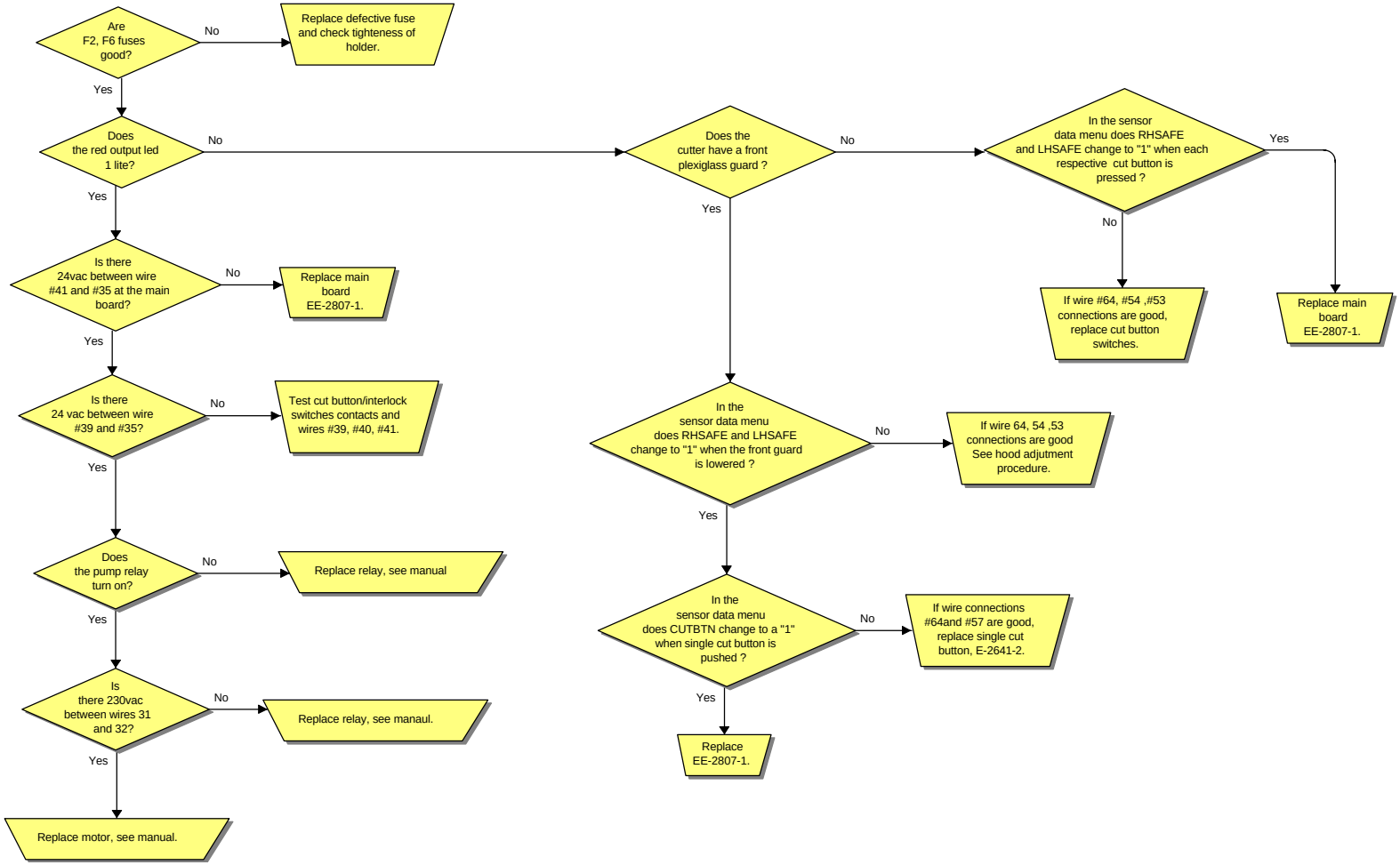
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	H-203-6	CLAMP UP SEQUENCE VALVE	1
2	H-203-18	CHECK VALVE	3
3	H-203-17	KNIFE SEQUENCE VALVE	1
4	H-203-13	PRESSURE REDUCING VALVE	1
5	H-200-2	SOLENOID VALVE	1
6	S-1810-10	O-RING	2
7	E-1069-( )	COIL	REF
8	H-204	PISTON - HYD. VALVE	1
9	H-484	ORIFICE PLUG - 1/64	1
10	S-2020	"O"-RING	1
11	HH-304-1	RELIEF VALVE KIT	REF

Basic hydraulic schematic

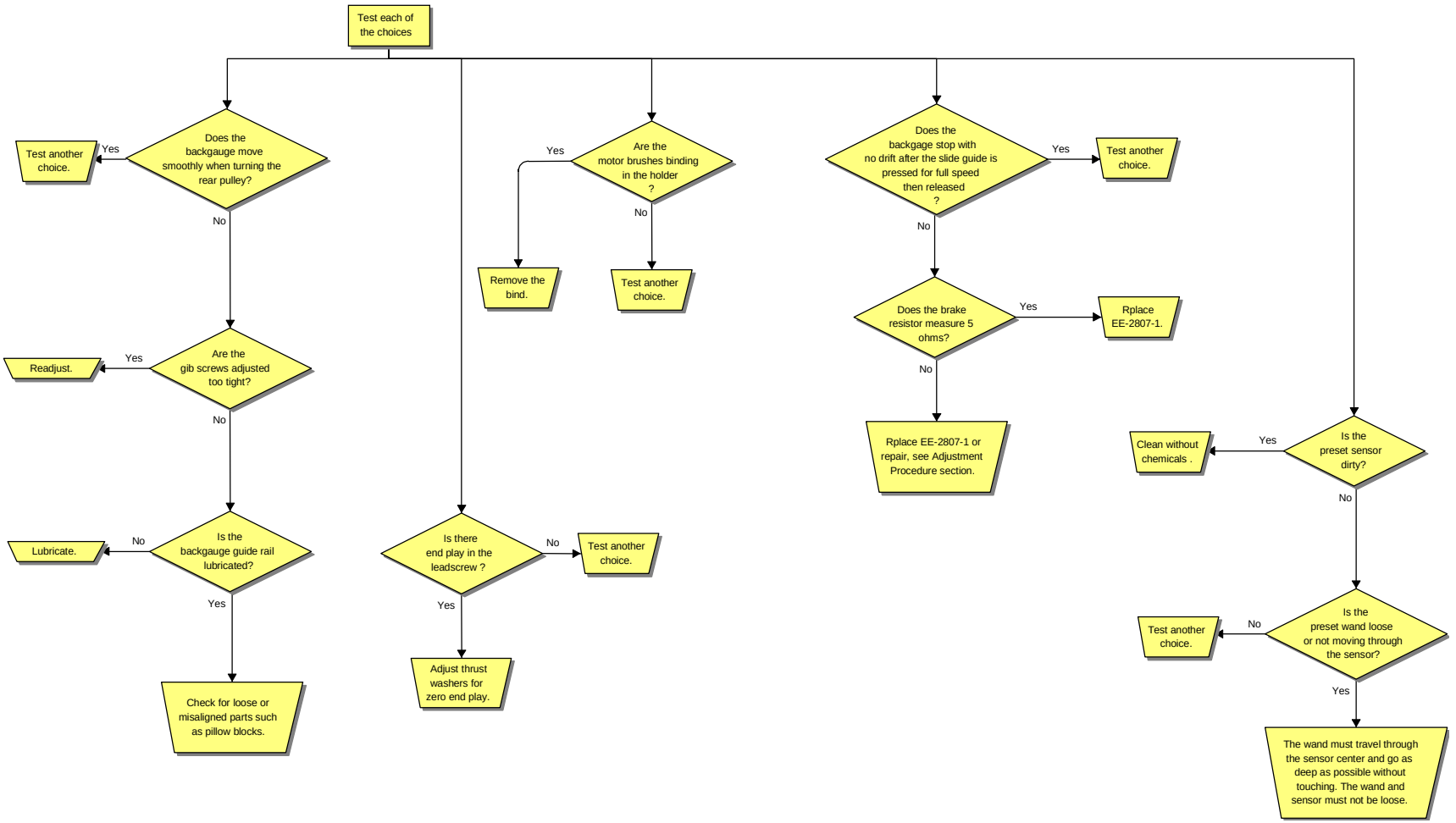
CHAMPION and TITAN CONSOLE PROGRAM MAP



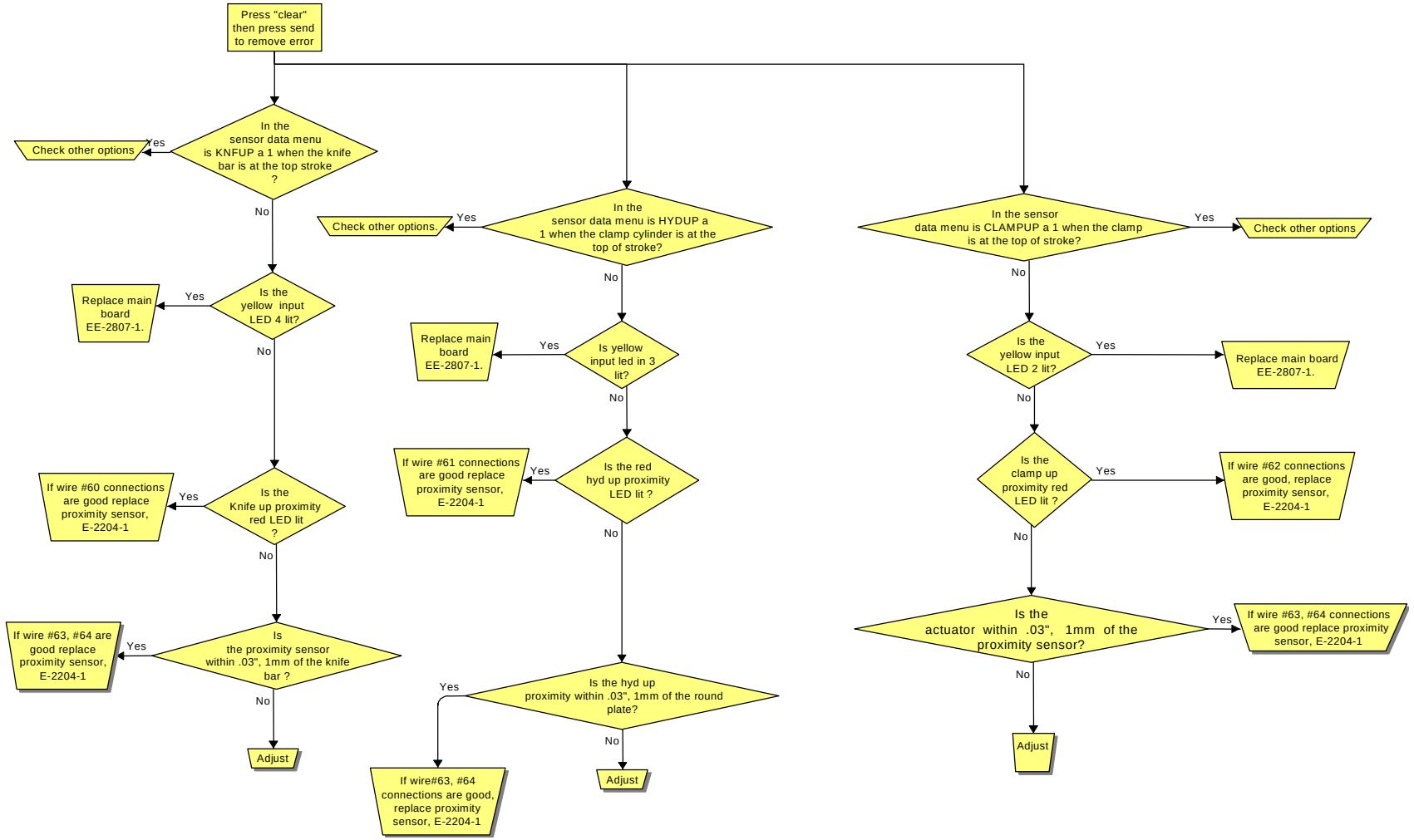
Hydraulic Motor didn’t start


Are F2, F6 fuses good?
No
Replace defective fuse and check tightness of holder.
Yes
Does the red output led 1 lite?
No
Yes
Is there 24vac between wire #41 and #35 at the main board?
No
Replace main board EE-2807-1.
Yes
Is there 24 vac between wire #39 and #35?
No
Test cut button/interlock switches contacts and wires #39, #40, #41.
Yes
Does the pump relay turn on?
No
Replace relay, see manual
Yes
Is there 230vac between wires 31 and 32?
No
Replace relay, see manaul.
Yes
Replace motor, see manual.
Does the cutter have a front plexiglass guard ?
No
Yes
In the sensor data menu does RHSAFE and LHSAFE change to "1" when each respective cut button is pressed ?
Yes
No
If wire #64, #54 ,#53 connections are good, replace cut button switches.
Replace main board EE-2807-1.
In the sensor data menu does RHSAFE and LHSAFE change to "1" when the front guard is lowered ?
No
If wire 64, 54 ,53 connections are good See hood adjutment procedure.
Yes
In the sensor data menu does CUTBTN change to a "1" when single cut button is pushed ?
No
If wire connections #64and #57 are good, replace single cut button, E-2641-2.
Yes
Replace EE-2807-1.

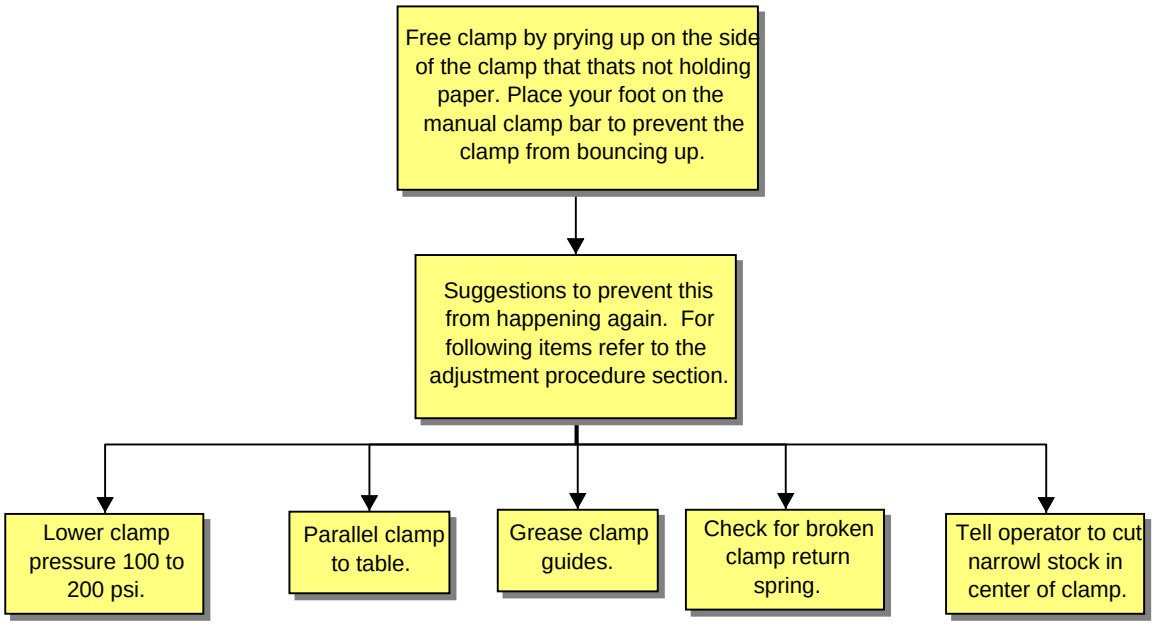
Positioning error


Test each of the choices
Does the backgauge move smoothly when turning the rear pulley?
Yes
Test another choice.
No
Are the gib screws adjusted too tight?
Yes
Readjust.
No
Is the backgauge guide rail lubricated?
No
Lubricate.
Yes
Check for loose or misaligned parts such as pillow blocks.
Are the motor brushes binding in the holder ?
Yes
Remove the bind.
No
Test another choice.
Is there end play in the leadscrew ?
No
Test another choice.
Yes
Adjust thrust washers for zero end play.
Does the backgage stop with no drift after the slide guide is pressed for full speed then released ?
Yes
Test another choice.
No
Does the brake resistor measure 5 ohms?
Yes
Rplace EE-2807-1.
No
Rplace EE-2807-1 or repair, see Adjustment Procedure section.
Is the preset sensor dirty?
Yes
Clean without chemicals .
No
Is the preset wand loose or not moving through the sensor?
No
Test another choice.
Yes
The wand must travel through the sensor center and go as deep as possible without touching. The wand and sensor must not be loose.

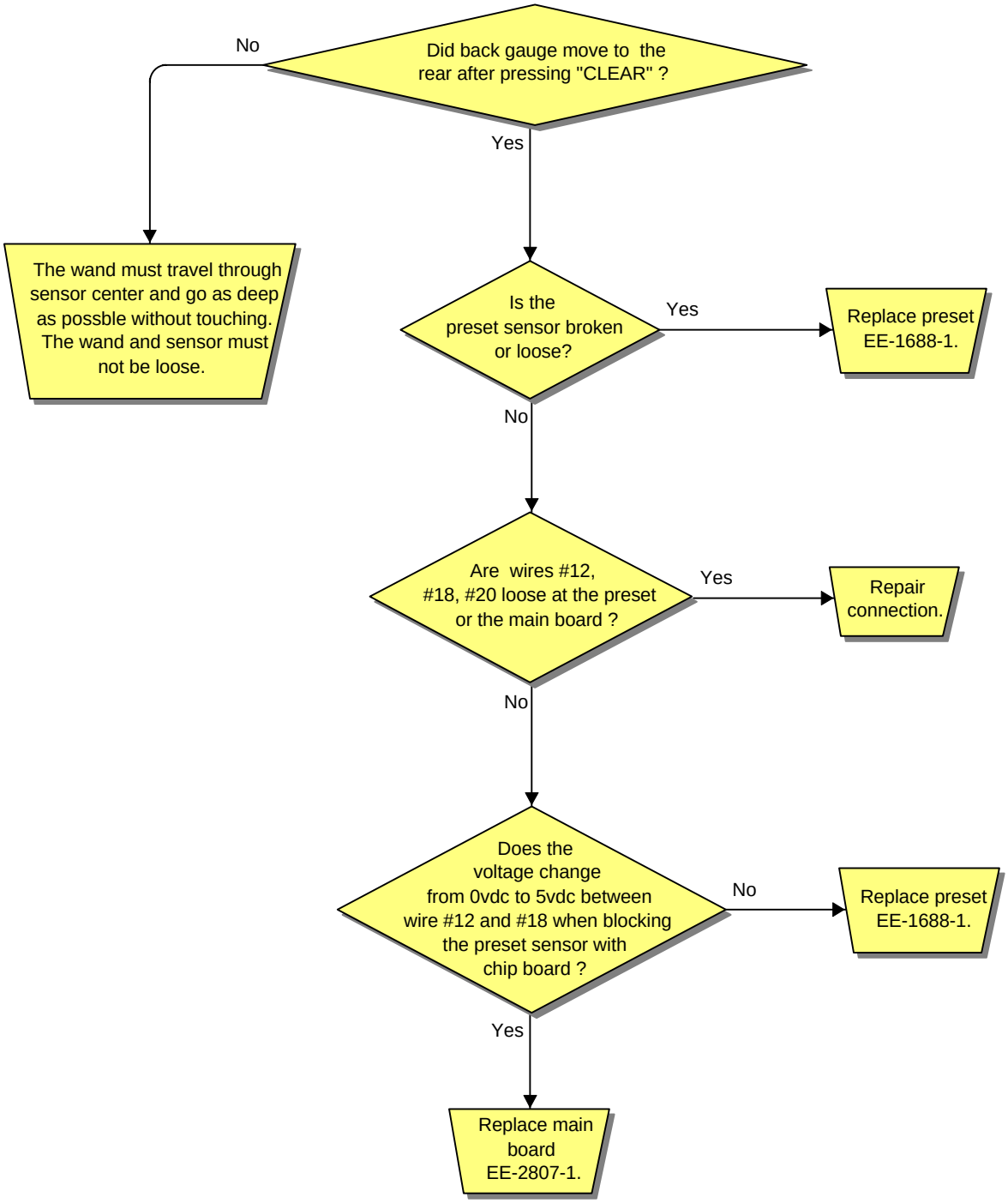
Clamp/Knife down


Press "clear" then press send to remove error
In the sensor data menu is KNFUP a 1 when the knife bar is at the top stroke ?
Yes
Check other options
No
Is the yellow input LED 4 lit?
Yes
Replace main board EE-2807-1.
No
Is the Knife up proximity red LED lit ?
Yes
If wire #60 connections are good replace proximity sensor, E-2204-1
No
Is the proximity sensor within .03", 1mm of the knife bar ?
Yes
If wire #63, #64 are good replace proximity sensor, E-2204-1
No
Adjust
In the sensor data menu is HYDUP a 1 when the clamp cylinder is at the top of stroke?
Yes
Check other options.
No
Is yellow input led in 3 lit?
Yes
Replace main board EE-2807-1.
No
Is the red hyd up proximity LED lit ?
Yes
If wire #61 connections are good replace proximity sensor, E-2204-1
No
Is the hyd up proximity within .03", 1mm of the round plate?
Yes
If wire#63, #64 connections are good, replace proximity sensor, E-2204-1
No
Adjust
In the sensor data menu is CLAMPUP a 1 when the clamp is at the top of stroke?
Yes
Check other options
No
Is the yellow input LED 2 lit?
Yes
Replace main board EE-2807-1.
No
Is the clamp up proximity red LED lit ?
Yes
If wire #62 connections are good, replace proximity sensor, E-2204-1
No
Is the actuator within .03", 1mm of the proximity sensor?
Yes
If wire #63, #64 connections are good replace proximity sensor, E-2204-1
No
Adjust

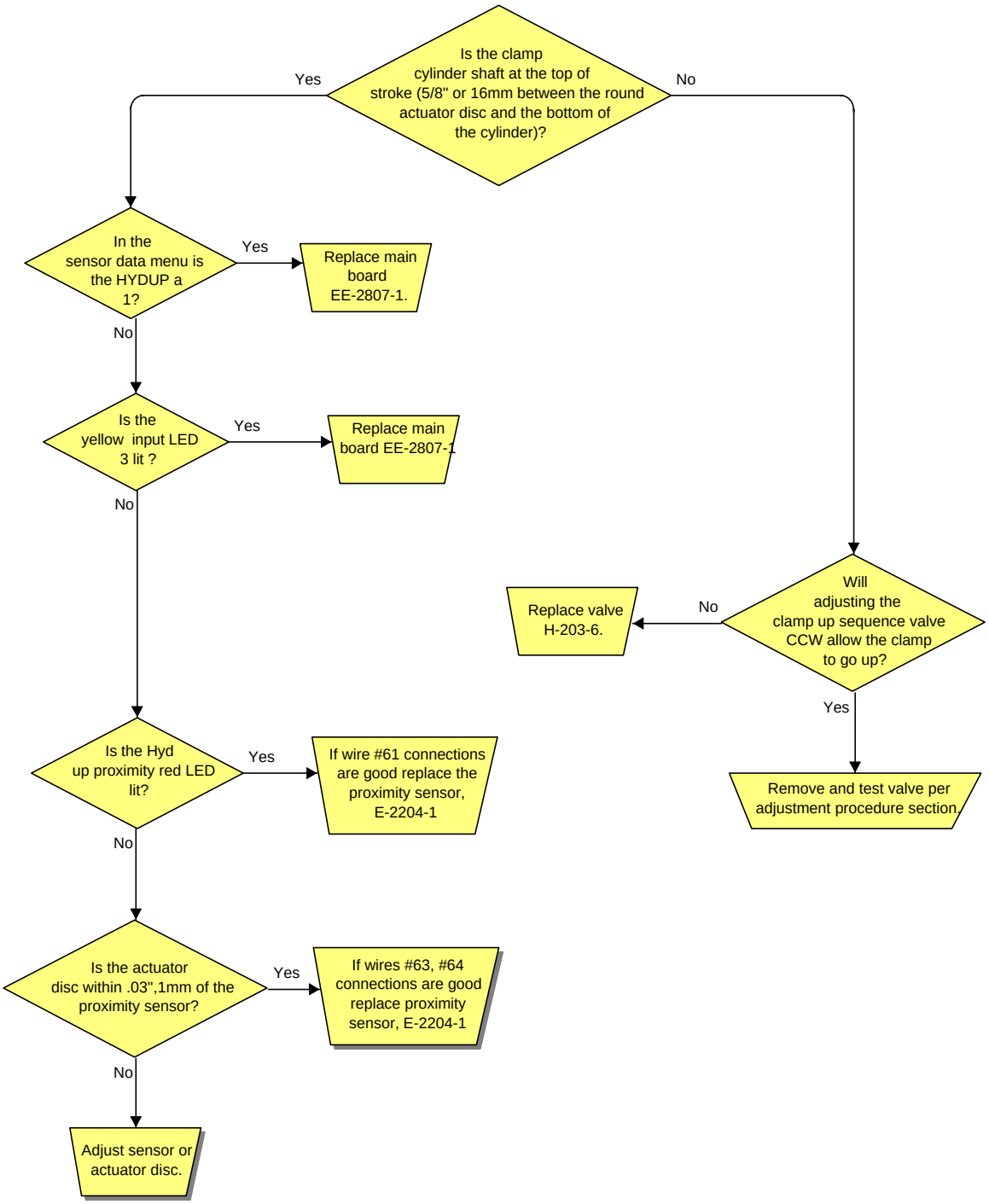
Clamp stuck down


Free clamp by prying up on the side of the clamp that thats not holding paper. Place your foot on the manual clamp bar to prevent the clamp from bouncing up.
Suggestions to prevent this from happening again. For following items refer to the adjustment procedure section.
Lower clamp pressure 100 to 200 psi.
Parallel clamp to table.
Grease clamp guides.
Check for broken clamp return spring.
Tell operator to cut narrowl stock in center of clamp.

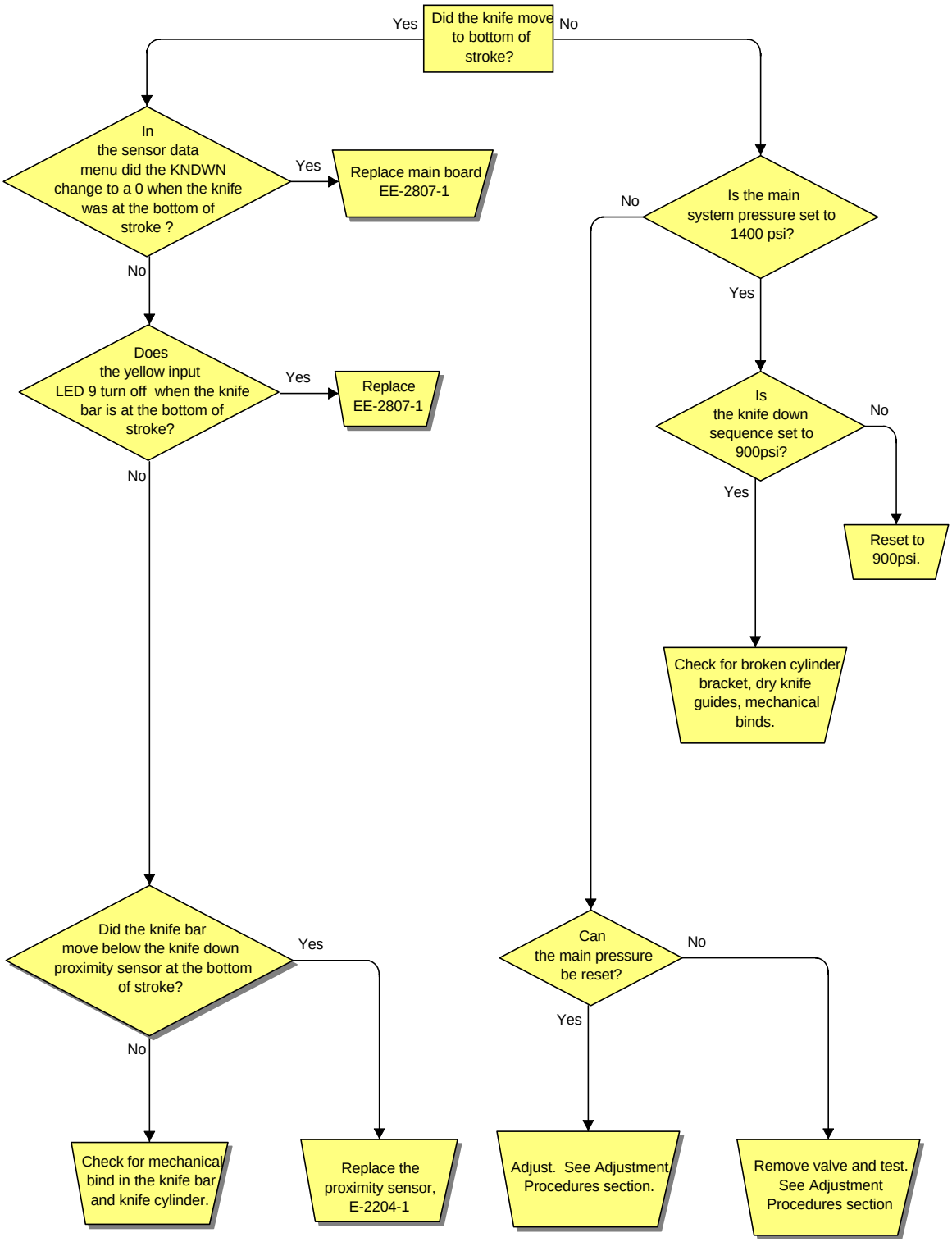
Slow backgauge movement to end of table


Did back gauge move to the rear after pressing "CLEAR" ?
No
Yes
The wand must travel through sensor center and go as deep as possble without touching. The wand and sensor must not be loose.
Is the preset sensor broken or loose?
Yes
Replace preset EE-1688-1.
No
Are wires #12, #18, #20 loose at the preset or the main board ?
Yes
Repair connection.
No
Does the voltage change from 0vdc to 5vdc between wire #12 and #18 when blocking the preset sensor with chip board ?
No
Replace preset EE-1688-1.
Yes
Replace main board EE-2807-1.

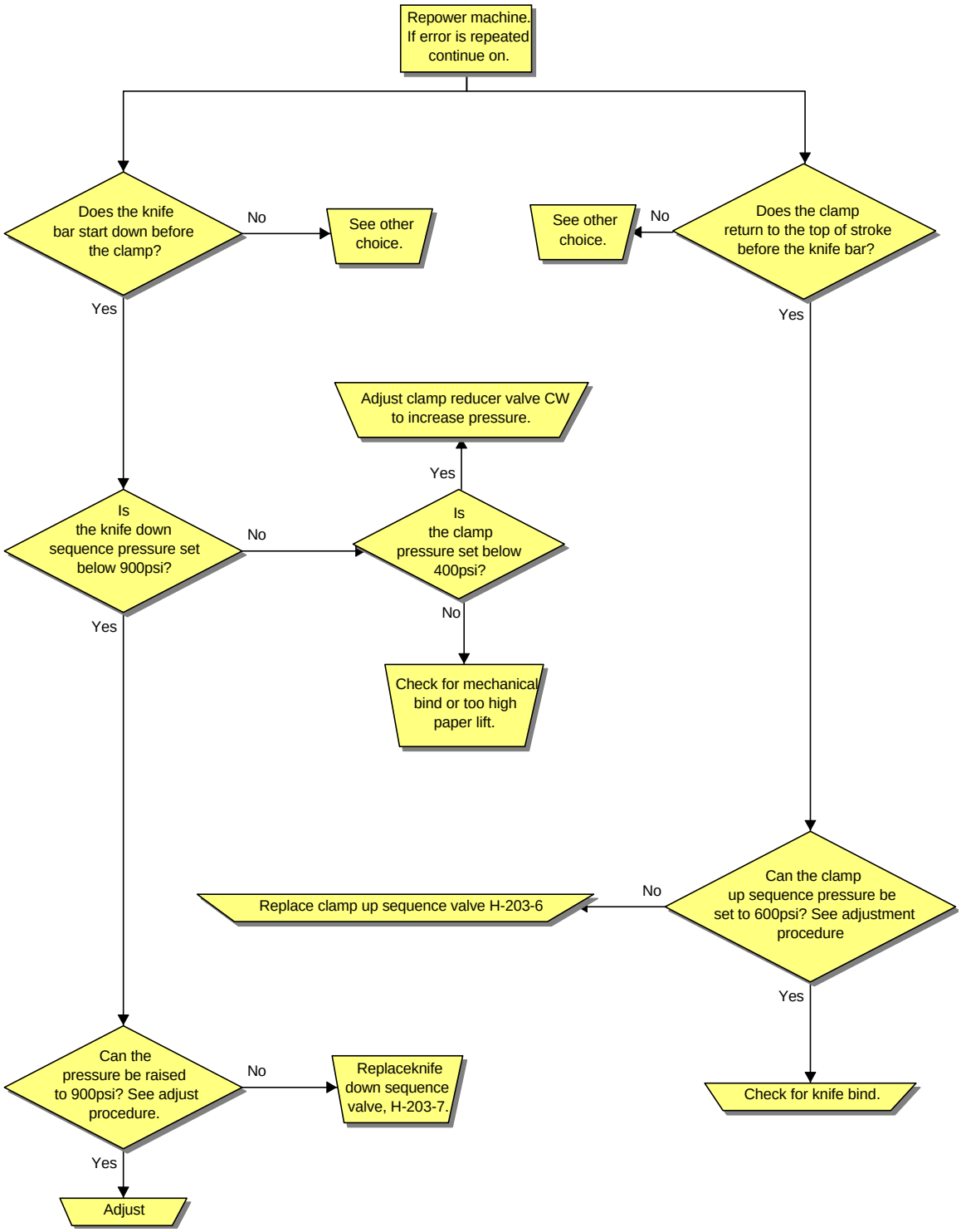
Hydraulic up failure


Is the clamp cylinder shaft at the top of stroke (5/8" or 16mm between the round actuator disc and the bottom of the cylinder)?
Yes
No
In the sensor data menu is the HYDUP a 1?
Yes
Replace main board EE-2807-1.
No
Is the yellow input LED 3 lit ?
Yes
Replace main board EE-2807-1
No
Will adjusting the clamp up sequence valve CCW allow the clamp to go up?
No
Replace valve H-203-6.
Yes
Remove and test valve per adjustment procedure section.
Is the Hyd up proximity red LED lit?
Yes
If wire #61 connections are good replace the proximity sensor, E-2204-1
No
Is the actuator disc within .03",1mm of the proximity sensor?
Yes
If wires #63, #64 connections are good replace proximity sensor, E-2204-1
No
Adjust sensor or actuator disc.

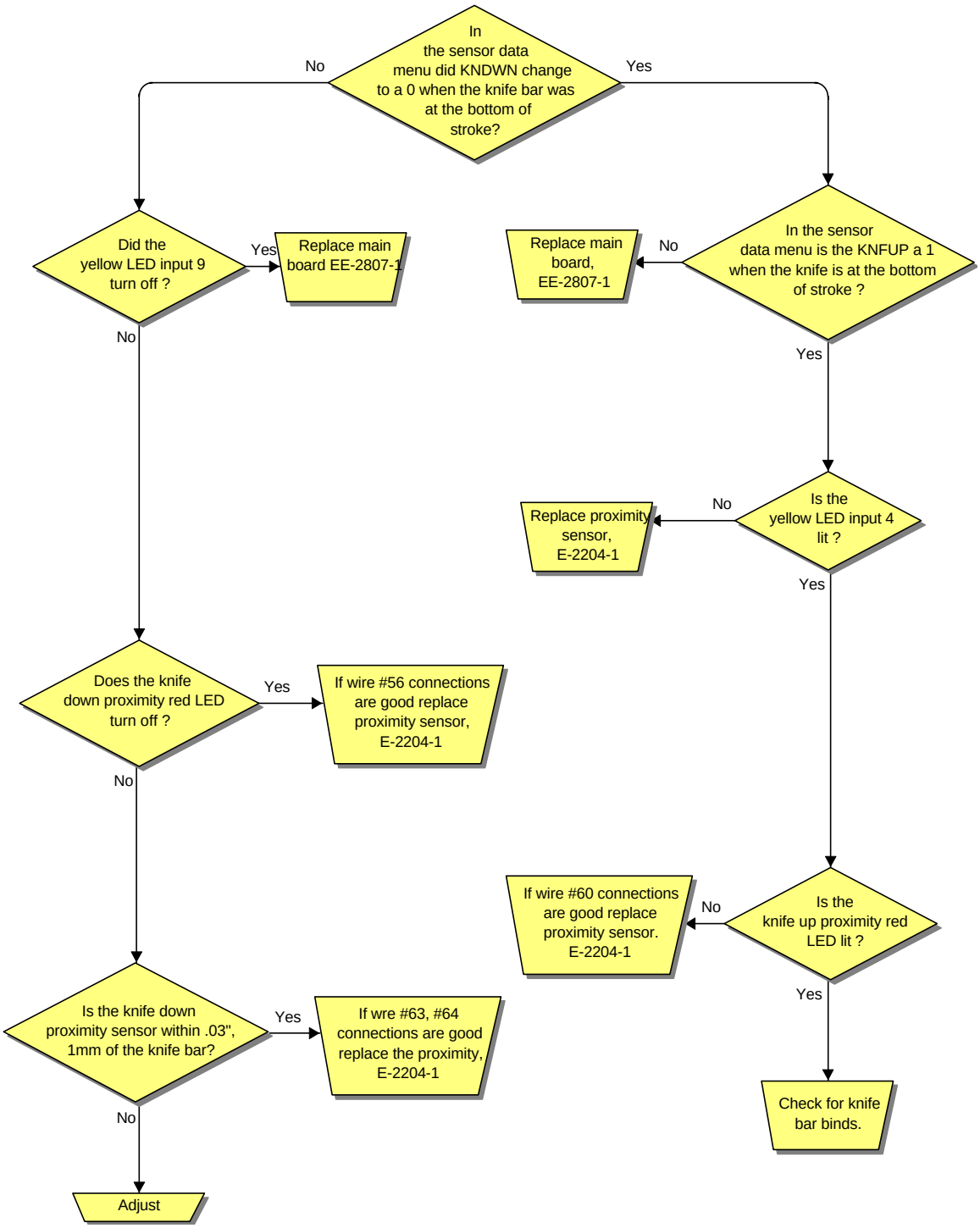
Knife down failure


Did the knife move to bottom of stroke?
Yes
No
In the sensor data menu did the KNDWN change to a 0 when the knife was at the bottom of stroke ?
Yes
Replace main board EE-2807-1
No
Does the yellow input LED 9 turn off when the knife bar is at the bottom of stroke?
Yes
Replace EE-2807-1
No
Did the knife bar move below the knife down proximity sensor at the bottom of stroke?
Yes
No
Check for mechanical bind in the knife bar and knife cylinder.
Replace the proximity sensor, E-2204-1
Is the main system pressure set to 1400 psi?
No
Yes
Is the knife down sequence set to 900psi?
No
Yes
Reset to 900psi.
Check for broken cylinder bracket, dry knife guides, mechanical binds.
Can the main pressure be reset?
No
Yes
Adjust. See Adjustment Procedures section.
Remove valve and test. See Adjustment Procedures section

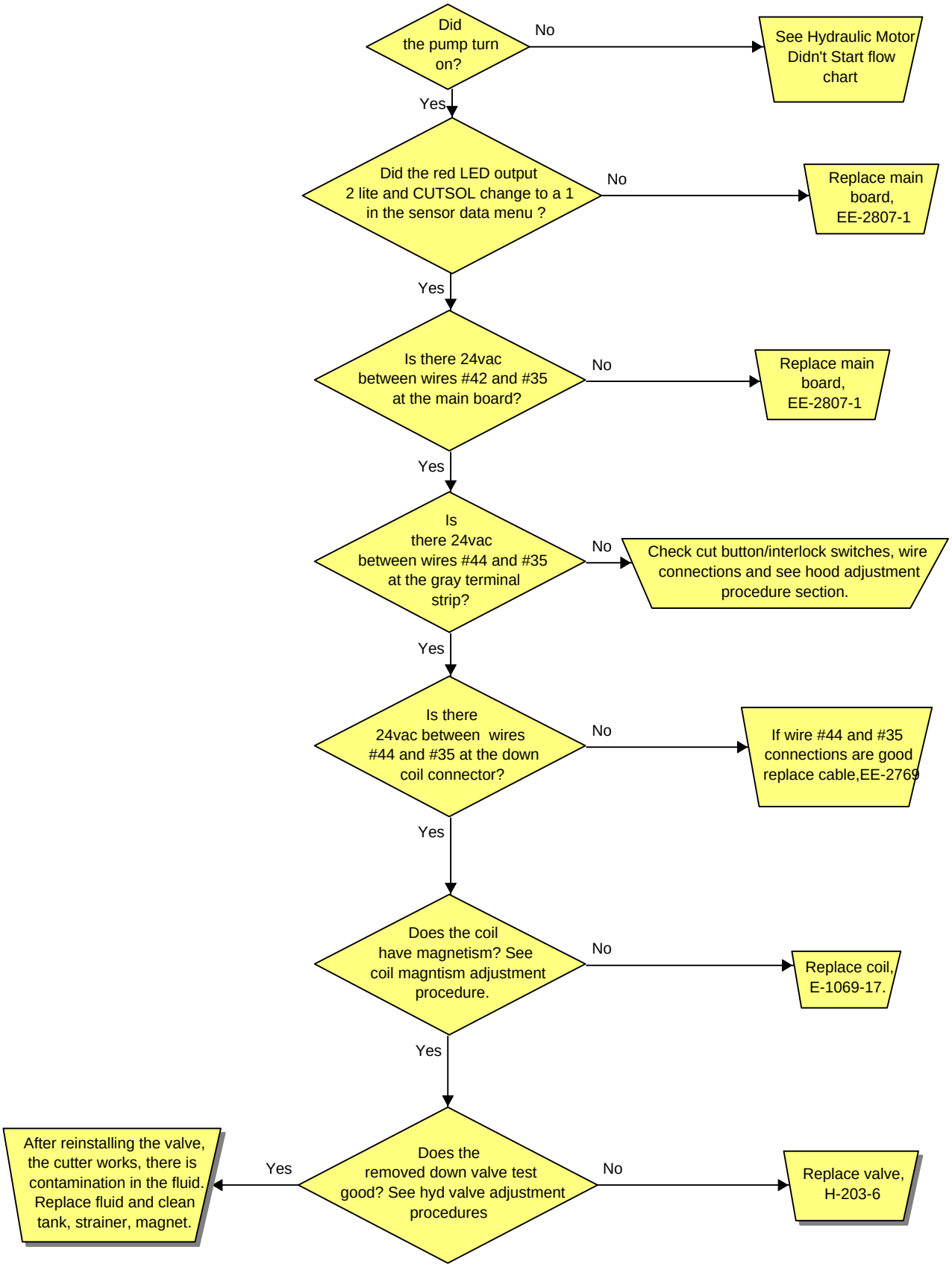
Sequence error


Repower machine. If error is repeated continue on.
Does the knife bar start down before the clamp?
No
See other choice.
Yes
Does the clamp return to the top of stroke before the knife bar?
No
See other choice.
Yes
Adjust clamp reducer valve CW to increase pressure.
Yes
Is the knife down sequence pressure set below 900psi?
No
Is the clamp pressure set below 400psi?
No
Yes
Check for mechanical bind or too high paper lift.
Can the clamp up sequence pressure be set to 600psi? See adjustment procedure
No
Replace clamp up sequence valve H-203-6
Yes
Check for knife bind.
Can the pressure be raised to 900psi? See adjust procedure.
No
Replaceknife down sequence valve, H-203-7.
Yes
Adjust

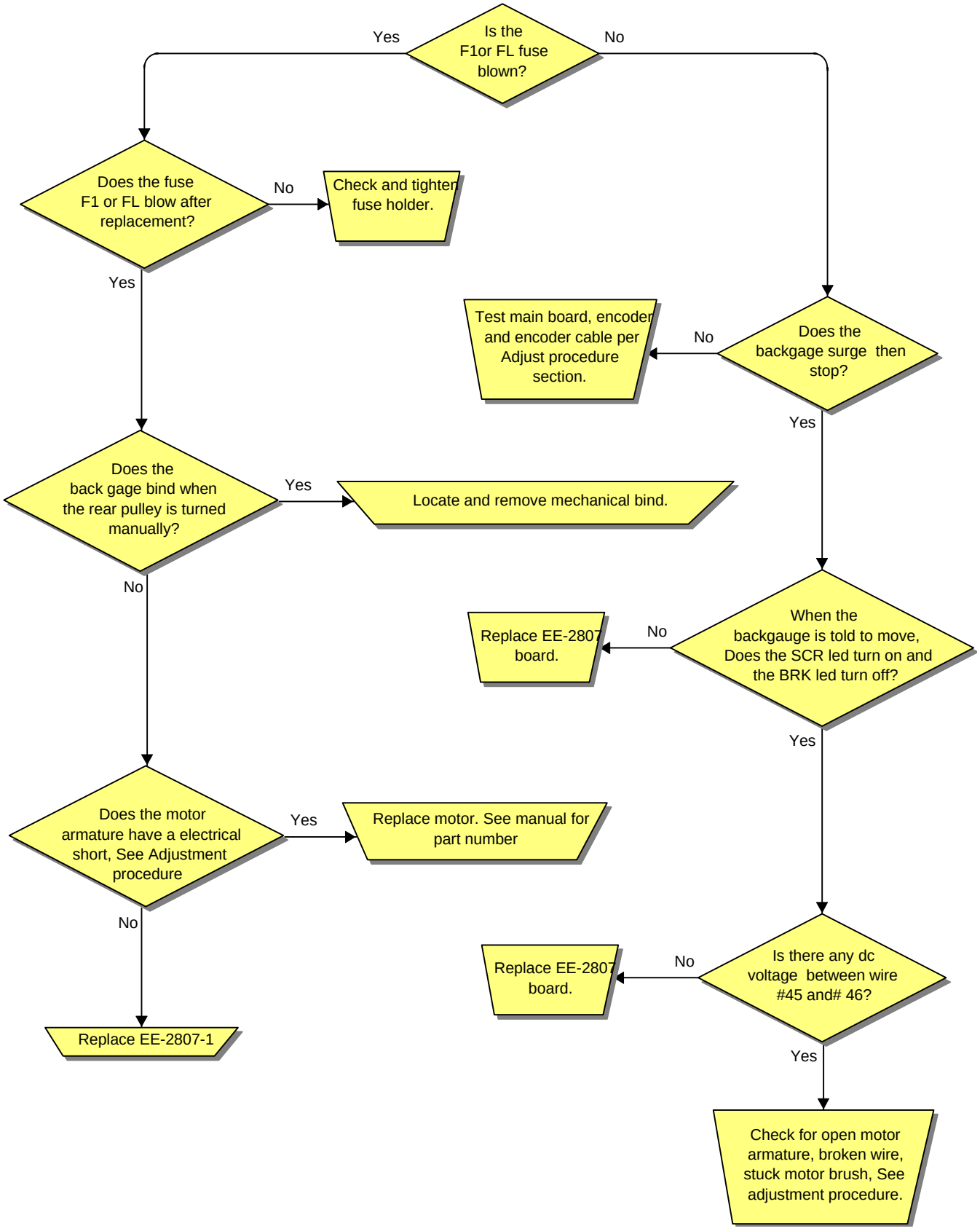
Knife at both limits


In the sensor data menu did KNDWN change to a 0 when the knife bar was at the bottom of stroke?
No
Yes
Did the yellow LED input 9 turn off ?
Yes
Replace main board EE-2807-1
No
Replace main board, EE-2807-1
No
In the sensor data menu is the KNFUP a 1 when the knife is at the bottom of stroke ?
Yes
Replace proximity sensor, E-2204-1
No
Is the yellow LED input 4 lit ?
Yes
Does the knife down proximity red LED turn off ?
Yes
If wire #56 connections are good replace proximity sensor, E-2204-1
No
If wire #60 connections are good replace proximity sensor. E-2204-1
No
Is the knife up proximity red LED lit ?
Yes
Is the knife down proximity sensor within .03", 1mm of the knife bar?
Yes
If wre #63, #64 connections are good replace the proximity, E-2204-1
No
Check for knife bar binds.
Adjust

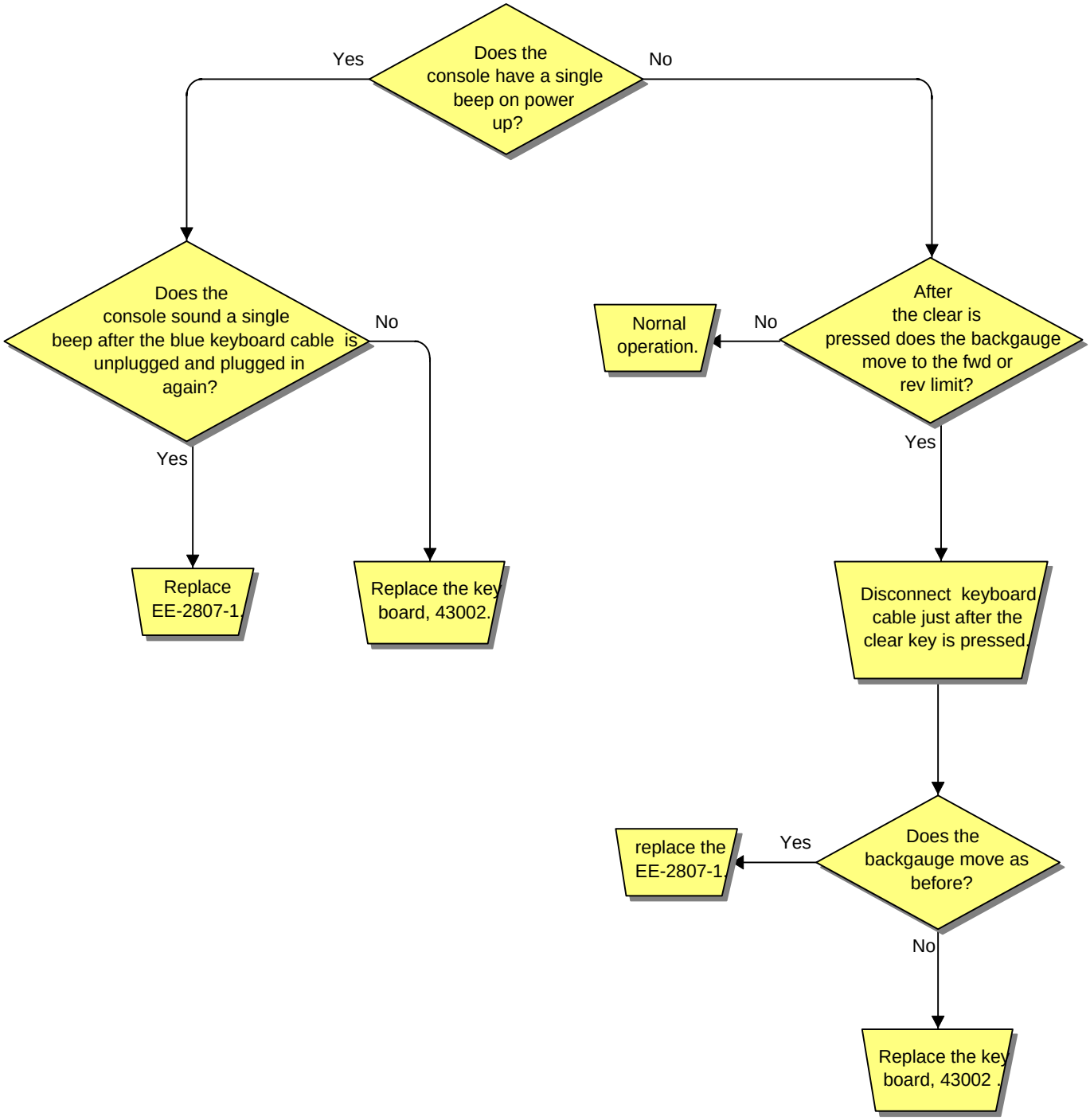
Clamp down failure


Did the pump turn on?
No
See Hydraulic Motor Didn't Start flow chart
Yes
Did the red LED output 2 lite and CUTSOL change to a 1 in the sensor data menu ?
No
Replace main board, EE-2807-1
Yes
Is there 24vac between wires #42 and #35 at the main board?
No
Replace main board, EE-2807-1
Yes
Is there 24vac between wires #44 and #35 at the gray terminal strip?
No
Check cut button/interlock switches, wire connections and see hood adjustment procedure section.
Yes
Is there 24vac between wires #44 and #35 at the down coil connector?
No
If wire #44 and #35 connections are good replace cable,EE-2769
Yes
Does the coil have magnetism? See coil magntism adjustment procedure.
No
Replace coil, E-1069-17.
Yes
Does the removed down valve test good? See hyd valve adjustment procedures
Yes
After reinstalling the valve, the cutter works, there is contamination in the fluid. Replace fluid and clean tank, strainer, magnet.
No
Replace valve, H-203-6

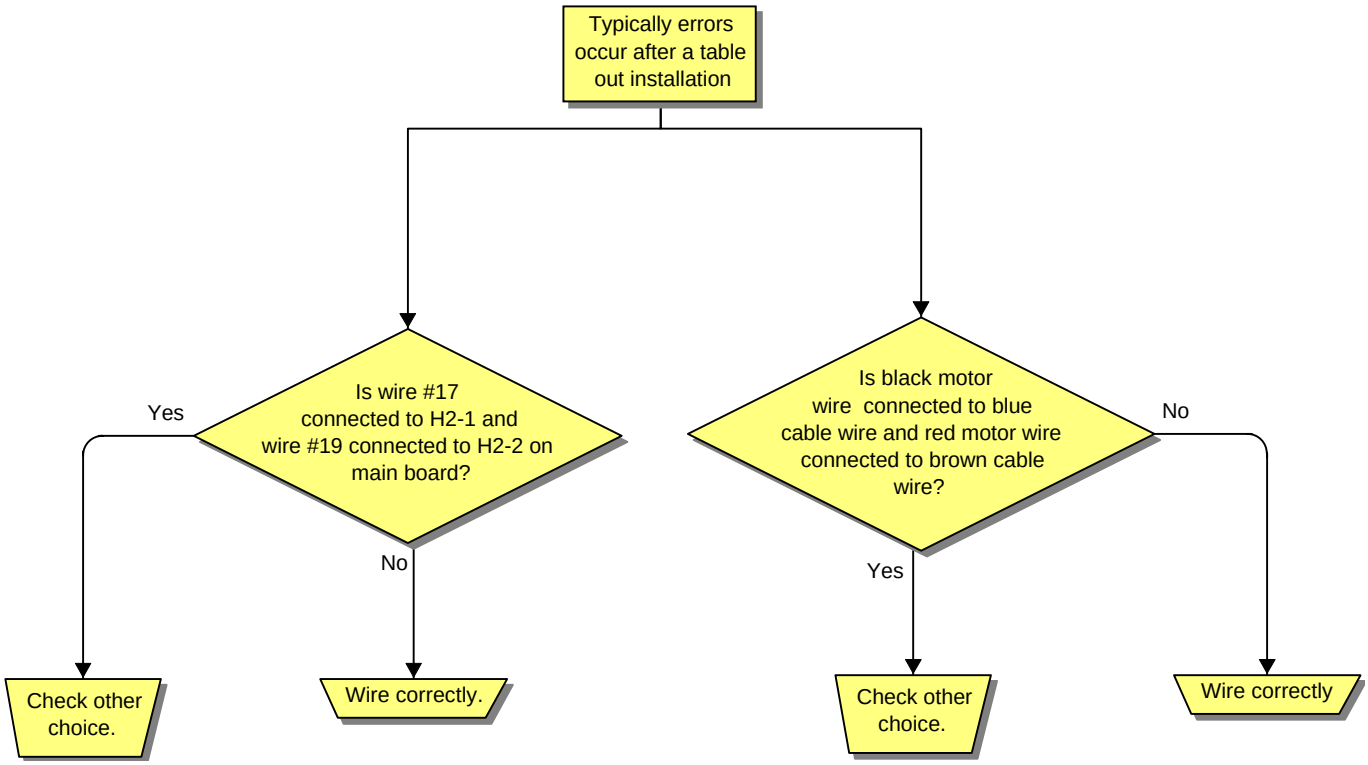
Backgauge failure


Is the F1or FL fuse blown?
Yes
No
Does the fuse F1 or FL blow after replacement?
No
Check and tighten fuse holder.
Yes
Does the backgage surge then stop?
No
Test main board, encoder and encoder cable per Adjust procedure section.
Yes
Does the back gage bind when the rear pulley is turned manually?
Yes
Locate and remove mechanical bind.
No
When the backgauge is told to move, Does the SCR led turn on and the BRK led turn off?
No
Replace EE-2807 board.
Yes
Does the motor armature have a electrical short, See Adjustment procedure
Yes
Replace motor. See manual for part number
No
Is there any dc voltage between wire #45 and# 46?
No
Replace EE-2807 board.
Yes
Replace EE-2807-1
Check for open motor armature, broken wire, stuck motor brush, See adjustment procedure.

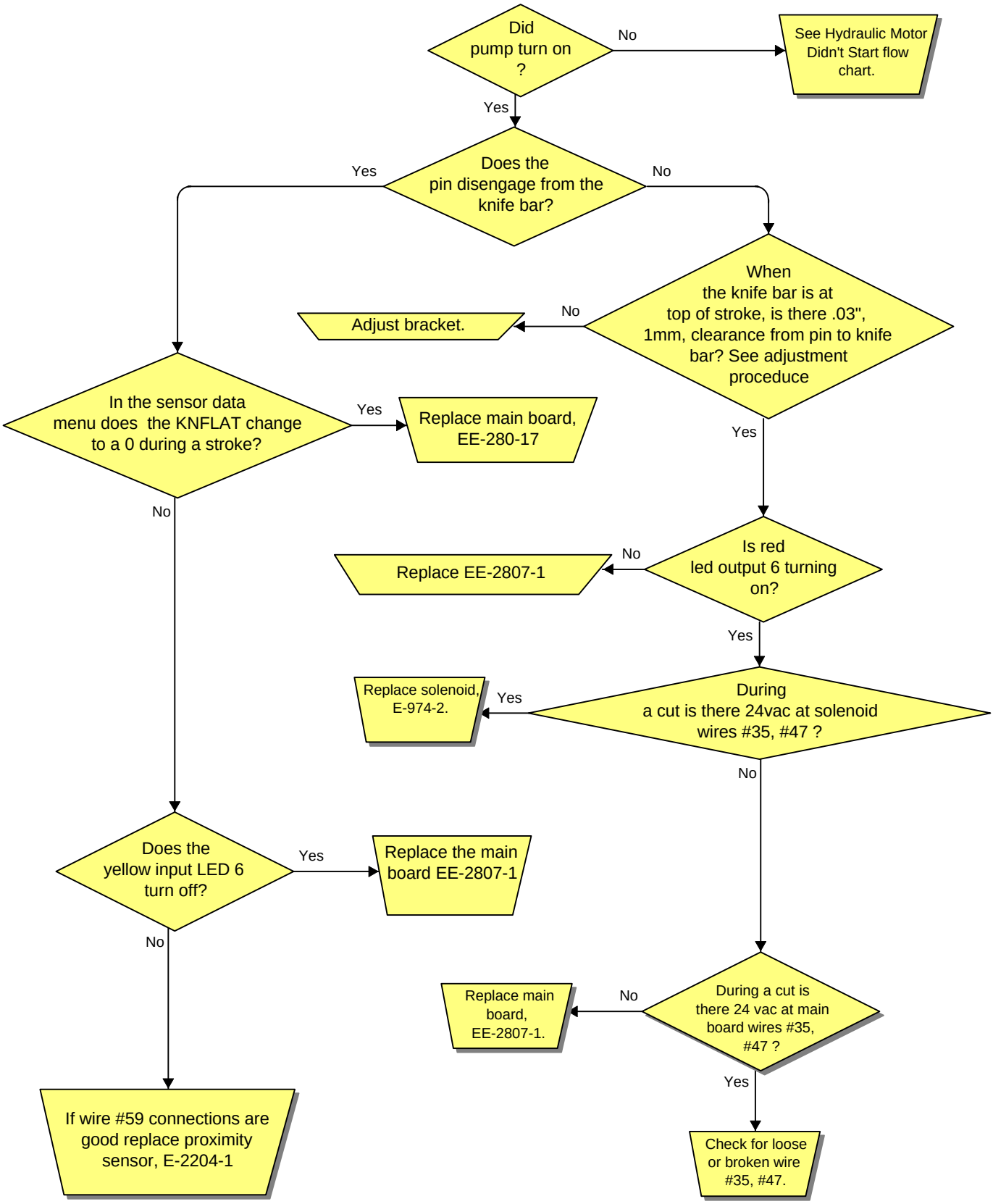
Shorted key error


Does the console have a single beep on power up?
Yes
No
Does the console sound a single beep after the blue keyboard cable is unplugged and plugged in again?
No
Yes
Replace EE-2807-1.
Replace the key board, 43002.
After the clear is pressed does the backgauge move to the fwd or rev limit?
No
Nornal operation.
Yes
Disconnect keyboard cable just after the clear key is pressed.
Does the backgauge move as before?
Yes
replace the EE-2807-1.
No
Replace the key board, 43002 .

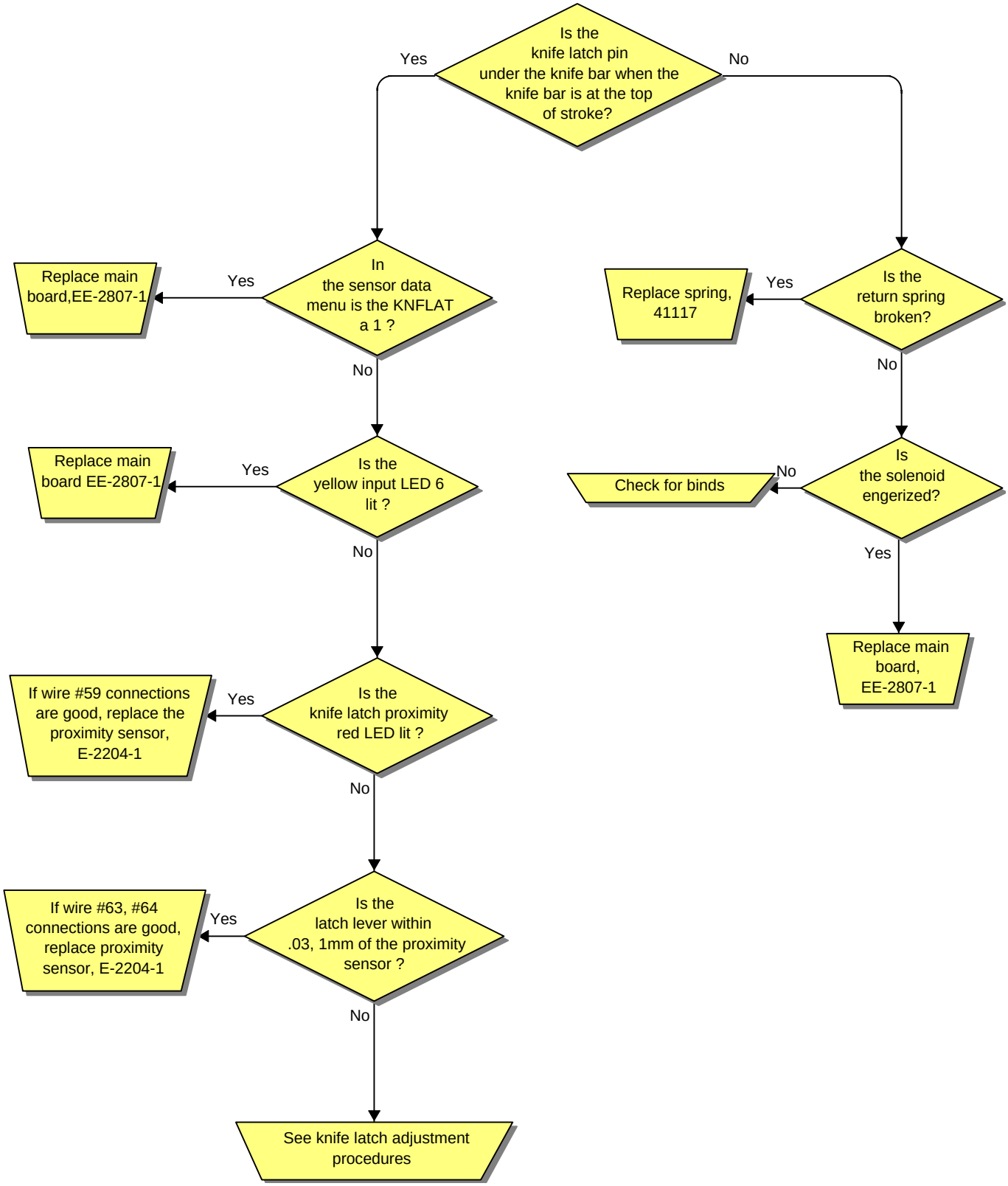
“Encoder wires 9 and 10 are reversed” or “Backgauge direction reversed”


Typically errors occur after a table out installation
Is wire #17 connected to H2-1 and wire #19 connected to H2-2 on main board?
Yes
No
Check other choice.
Wire correctly.
Is black motor wire connected to blue cable wire and red motor wire connected to brown cable wire?
Yes
No
Check other choice.
Wire correctly

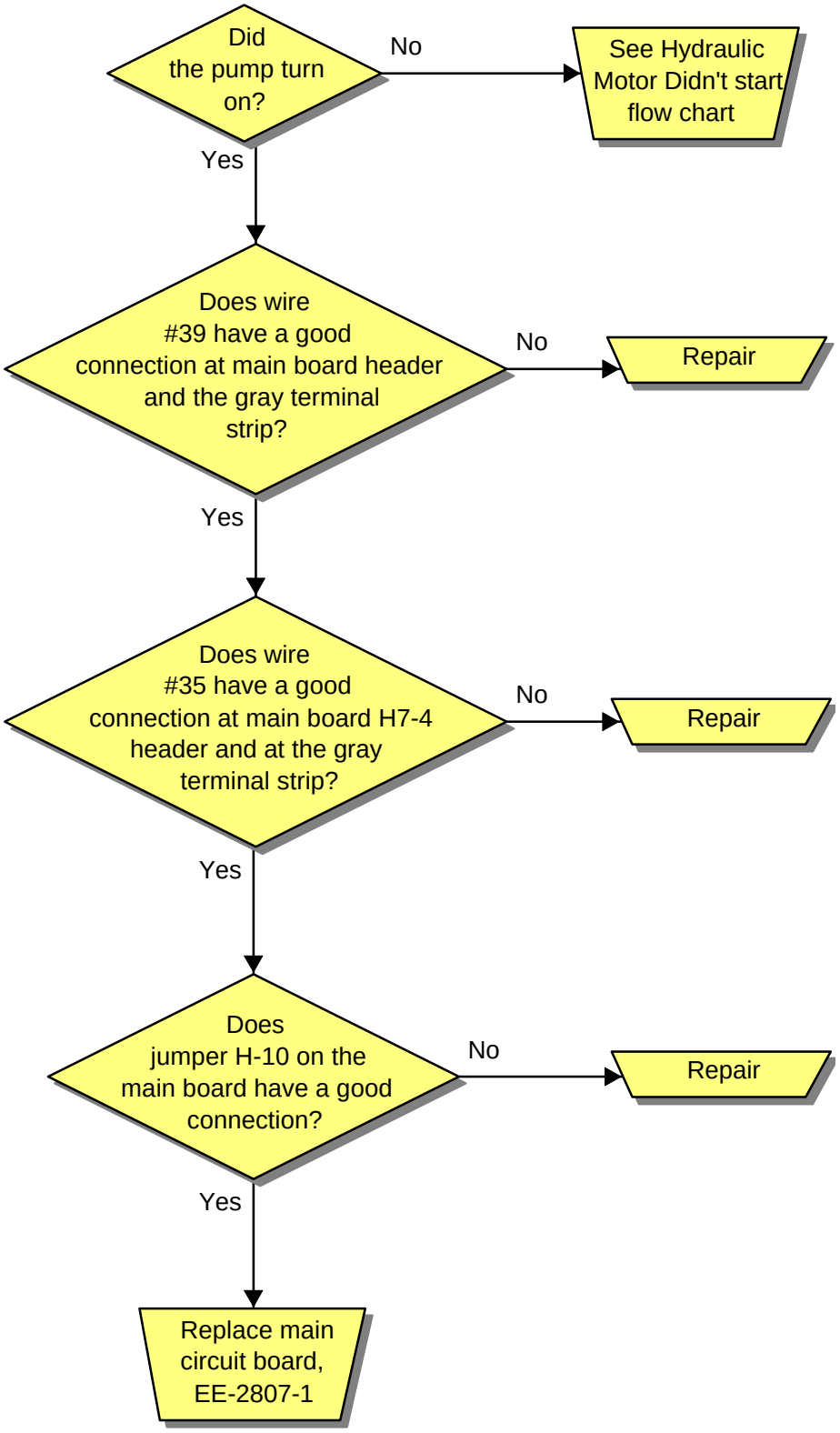
Knife latch failure 1


Did pump turn on ?
No
See Hydraulic Motor Didn't Start flow chart.
Yes
Does the pin disengage from the knife bar?
Yes
No
When the knife bar is at top of stroke, is there .03", 1mm, clearance from pin to knife bar? See adjustment proceduce
No
Adjust bracket.
In the sensor data menu does the KNFLAT change to a 0 during a stroke?
Yes
Replace main board, EE-280-17
Yes
No
Is red led output 6 turning on?
No
Replace EE-2807-1
Yes
During a cut is there 24vac at solenoid wires #35, #47 ?
Yes
Replace solenoid, E-974-2.
No
Does the yellow input LED 6 turn off?
Yes
Replace the main board EE-2807-1
No
During a cut is there 24 vac at main board wires #35, #47 ?
No
Replace main board, EE-2807-1.
Yes
Check for loose or broken wire #35, #47.
If wire #59 connections are good replace proximity sensor, E-2204-1

Knife latch failure 0


Is the knife latch pin under the knife bar when the knife bar is at the top of stroke?
Yes
No
In the sensor data menu is the KNFLAT a 1 ?
Yes
Replace main board,EE-2807-1
No
Is the return spring broken?
Yes
Replace spring, 41117
No
Is the yellow input LED 6 lit ?
Yes
Replace main board EE-2807-1
No
Is the solenoid engerized?
No
Check for binds
Yes
Replace main board, EE-2807-1
Is the knife latch proximity red LED lit ?
Yes
If wire #59 connections are good, replace the proximity sensor, E-2204-1
No
Is the latch lever within .03, 1mm of the proximity sensor ?
Yes
If wire #63, #64 connections are good, replace proximity sensor, E-2204-1
No
See knife latch adjustment procedures

Hydraulic latch error 1


Did the pump turn on?
No
See Hydraulic Motor Didn't start flow chart
Yes
Does wire #39 have a good connection at main board header and the gray terminal strip?
No
Repair
Yes
Does wire #35 have a good connection at main board H7-4 header and at the gray terminal strip?
No
Repair
Yes
Does jumper H-10 on the main board have a good connection?
No
Repair
Yes
Replace main circuit board, EE-2807-1